8805-7308

VOL. III

TN
859
.C64
C3755
no.1
v.3

U.S. DEPARTMENT OF THE INTERIOR

PROTOTYPE OIL SHALE LEASING PROGRAM

BLM Library
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# TRACT C-b

# QUARTERLY REPORT #1

( Through November 30, 1974 )

Submitted to:

Mr. Peter A. Rutledge
Area Oil Shale Supervisor
Conservation District
U. S. Geological Survey
Grand Junction, Colorado

By:

Ashland Oil, Inc.
Atlantic Richfield Company, Operator
Shell Oil Company
The Oil Shale Corporation

JANUARY 14, 1975

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Geophysical Logs

AQUIFER TEST WELL AT-1d

THIS ENVELOPE CONTAINS THE FOLLOWING GEOPHYSICAL LOGS:

Schlumberger: Borehole Compensated Sonic
Laterolog
Formation Density
Neutron Formation Density
Temperature

II B-365

Schlumberger

# BOREHOLE COMPENSATED SONIC LOG

COMPANY ATLANTIC RICHFIELD

ET AL

WELL SORGHUM GULCH 1-D

FIELD --

COUNTY RIO BLANCO STATE COLORADO

LOCATION: API Seriol No. 7108

1515 W LINE 1511 S LINE

Sec. 7 Twp. 3S Rge. 96W

Other Services:

DIL, FDC, CNL, GR, TEMP.

Permanent Datum: GL ; Elev.: 6903

Log Measured From GL , 0 Ft. Above Perm. Datum

Drilling Meosured From GL

Elev.: K.B. 6910

D.F. 6909

G.L. 6903

| | | | | |
|---|---|---|---|---|
| Date | 7/28/74 | | | |
| Run No. | ONE | | | |
| Depth—Driller | 1640 | | | |
| Depth—Logger | 1632 | | | |
| Btm. Log Intervol | 1620 | | | |
| Top Log Intervol | 60 | | | |
| Casing—Driller | 8 5/@ 60 | @ | @ | @ |
| Casing—Logger | 60 | | | |
| Bit Size | 7 7/8 | | | |
| Type Fluid in Hole | | | | |
| Dens. / Visc. | AIR / MIST | | | |
| pH / Fluid Loss | -- / -- ml | ml | ml | ml |
| Source of Sample | ---- | | | |
| Rm @ Meos. Temp. | -- @ -- °F | @ °F | @ °F | @ °F |
| Rmf @ Meos. Temp. | -- @ -- °F | @ °F | @ °F | @ °F |
| Rmc @ Meos. Temp. | -- @ -- °F | @ °F | @ °F | @ °F |
| Source: Rmf / Rmc | -- / -- | | | |
| Rm @ bHT | -- @ 90 °F | @ °F | @ °F | @ |
| Time Circulation Stopped | | | | |
| Time Logger on Bottom | 12 HOURS | | | |
| Max. Rec. Temp. | 90 °F | °F | °F | °F |
| Equip. / Locotion | 7674 / VERN | | | |
| Recorded By | STRAWN | | | |
| Witnessed By | MR TAIT | | | |

FOLD HERE

The well name, location and borehole reference data were furnished by the customer.

SCALE CHANGES

| Type Log | Depth | Scale Up Hole | Scale Down Hole |
|---|---|---|---|
| | | | |

LOGGING DATA

| Porosity Selectors | | | | Depth | |
|---|---|---|---|---|---|
| Δtm | Δtf | Cp | ϕ Scale | From | To |
| | | | | | |

REMARKS

Velocity (ft/sec) = 1,000,000 / Interval Transit Time (microseconds per foot)

EQUIPMENT DATA

| | |
|---|---|
| Sonic Ponel No. | 130 |
| Sonic Cart No. | 141 |
| Sonic Sonde No. | 161 |
| Mem. Panel No. | 173 |
| G.R. Cart. No. | 98 |
| G.R. Panel No. | 173 |
| Caliper No. | -- |
| TTR No. | -- |
| Centralizers: No. | |
| Type | |
| Standoffs: No. | |
| Type | |
| Time Const.-Sec. | |
| Speed - F.P.M. | |

CALIBRATION DATA

| | |
|---|---|
| GR BKG. CPS | |
| GR Source CPS | |
| GR Tc Sec | |

All interpretations are opinions based on inferences from electrical or other measurements and we cannot, and do not guarantee the accuracy or correctness of any interpretations, and we shall not, except in the case of gross or willful negligence on our part, be liable or responsible for any loss, costs, damages or expenses incurred or sustained by anyone resulting from any interpretation made by any of our officers, agents or employees. These interpretations are also subject to Clause 7 of our General Terms and Conditions as set out in our current Price Schedule.

INTERVAL TRANSIT TIME MICROSECONDS PER FOOT T 3 R1 2 R2

100 50 150

DEPTH

CALIPER DIAM. IN INCHES 6" 16"

GAMMA RAY API UNITS

INTERGRATED TRAVEL TIME

INTEGRATED TRAVEL-TIME

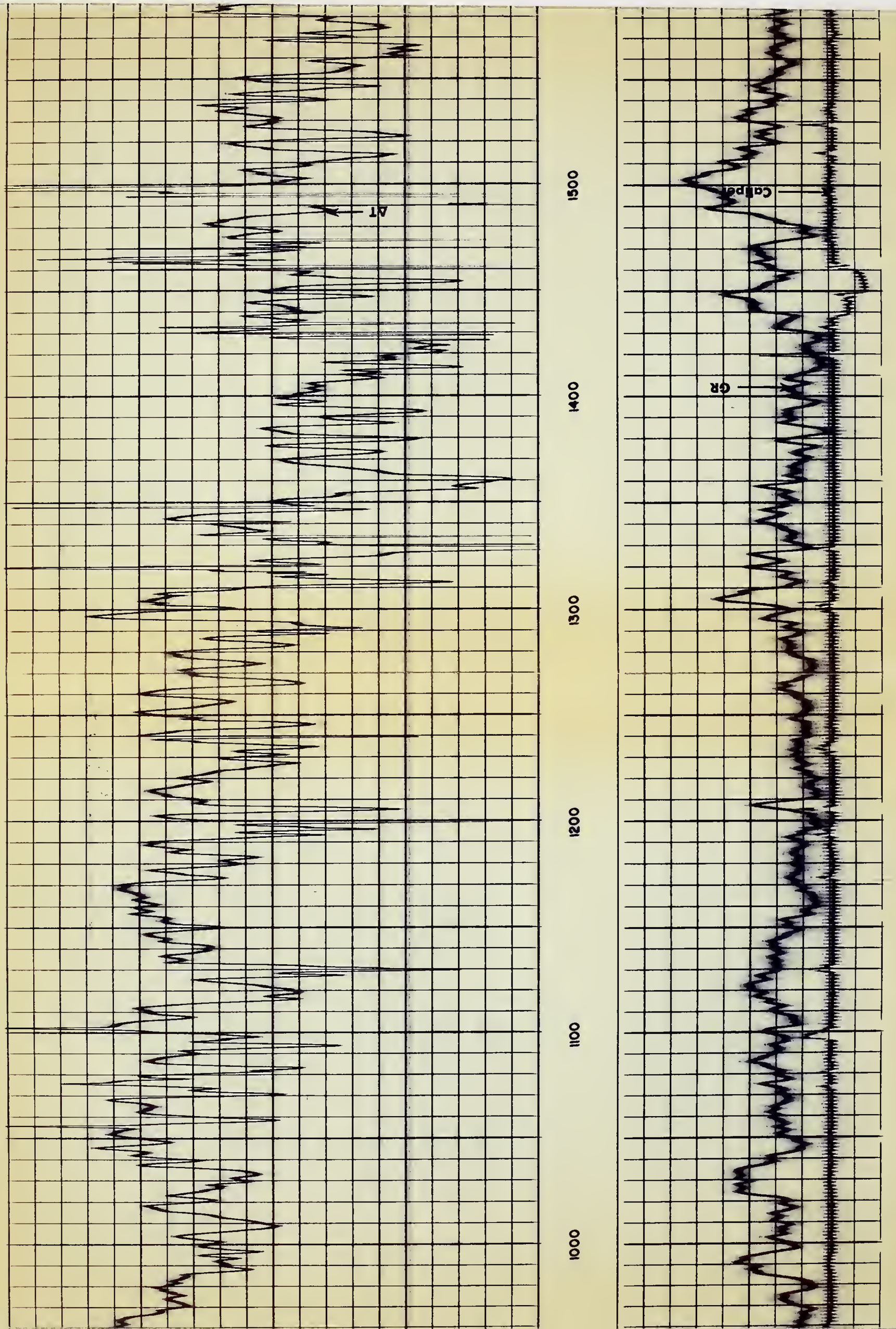
400 500 600 700 800 900

GAMMA RAY API UNITS

0 150

Caliper

GR


AT
GR
1000
1100
1200
1300
1400
1500

# DETAIL LOG

5" = 100'

**CALIPER** DIAM. IN INCHES

6 — 16

**GAMMA RAY** API UNITS

0 — 150

DEPTH

**INTERVAL TRANSIT TIME** MICROSECONDS PER FOOT T 3 $R_1$ 2 $R_2$

150 — 100 — 50

1600

1700

1800

1900

2000

2100

2200

2300

2400

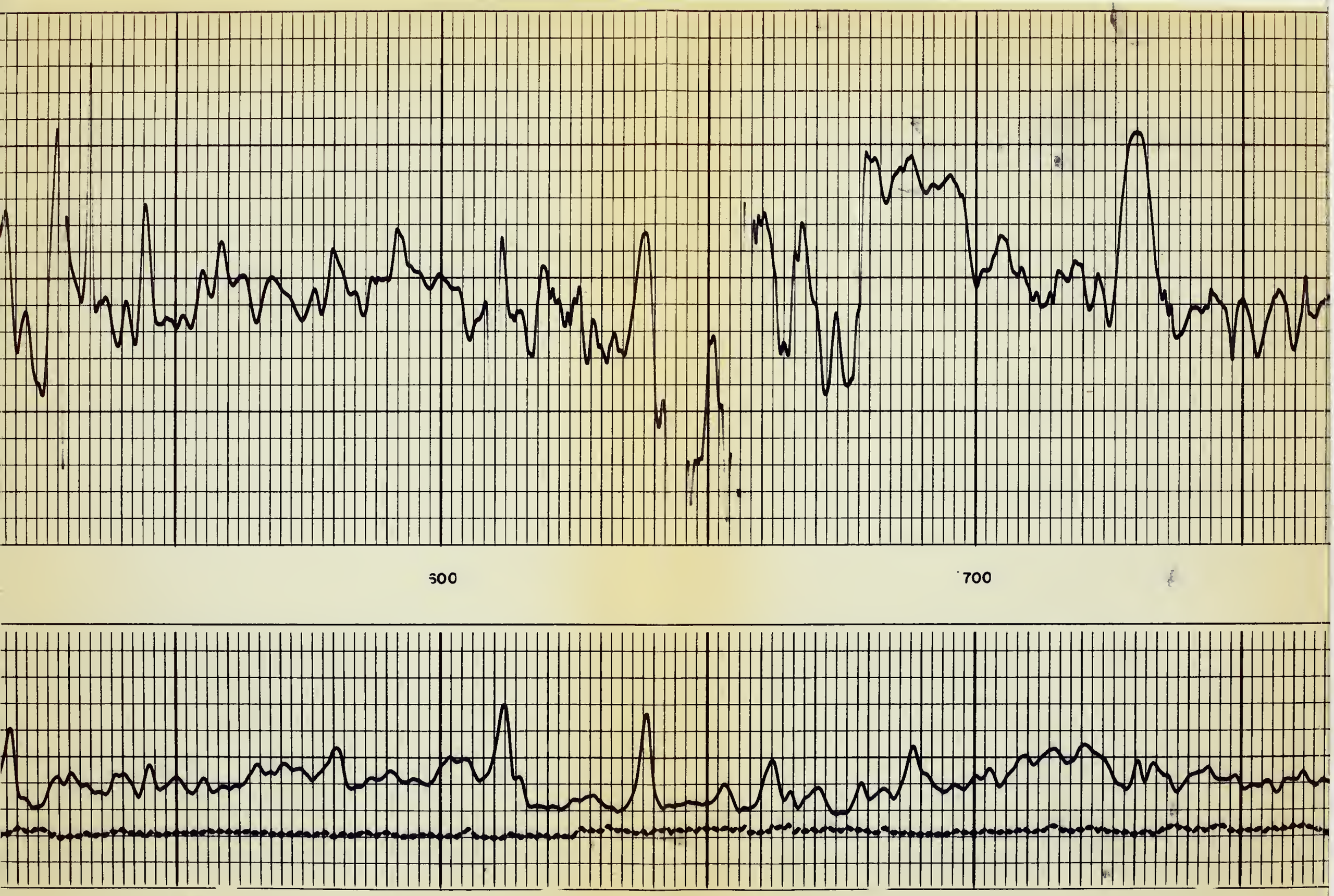
2500

Calibration after Survey

Caliper

GR

ΔT


600
700

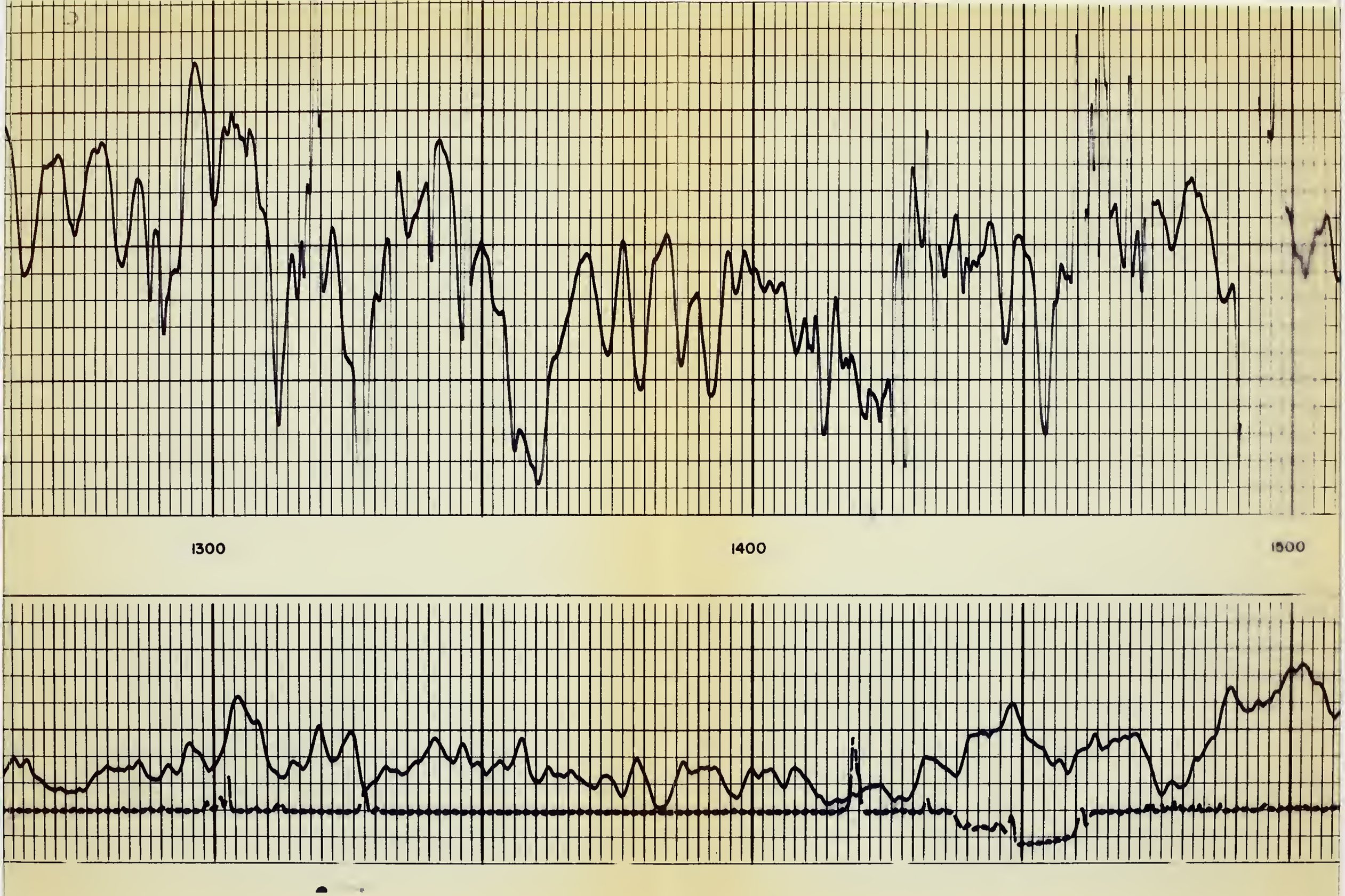
800

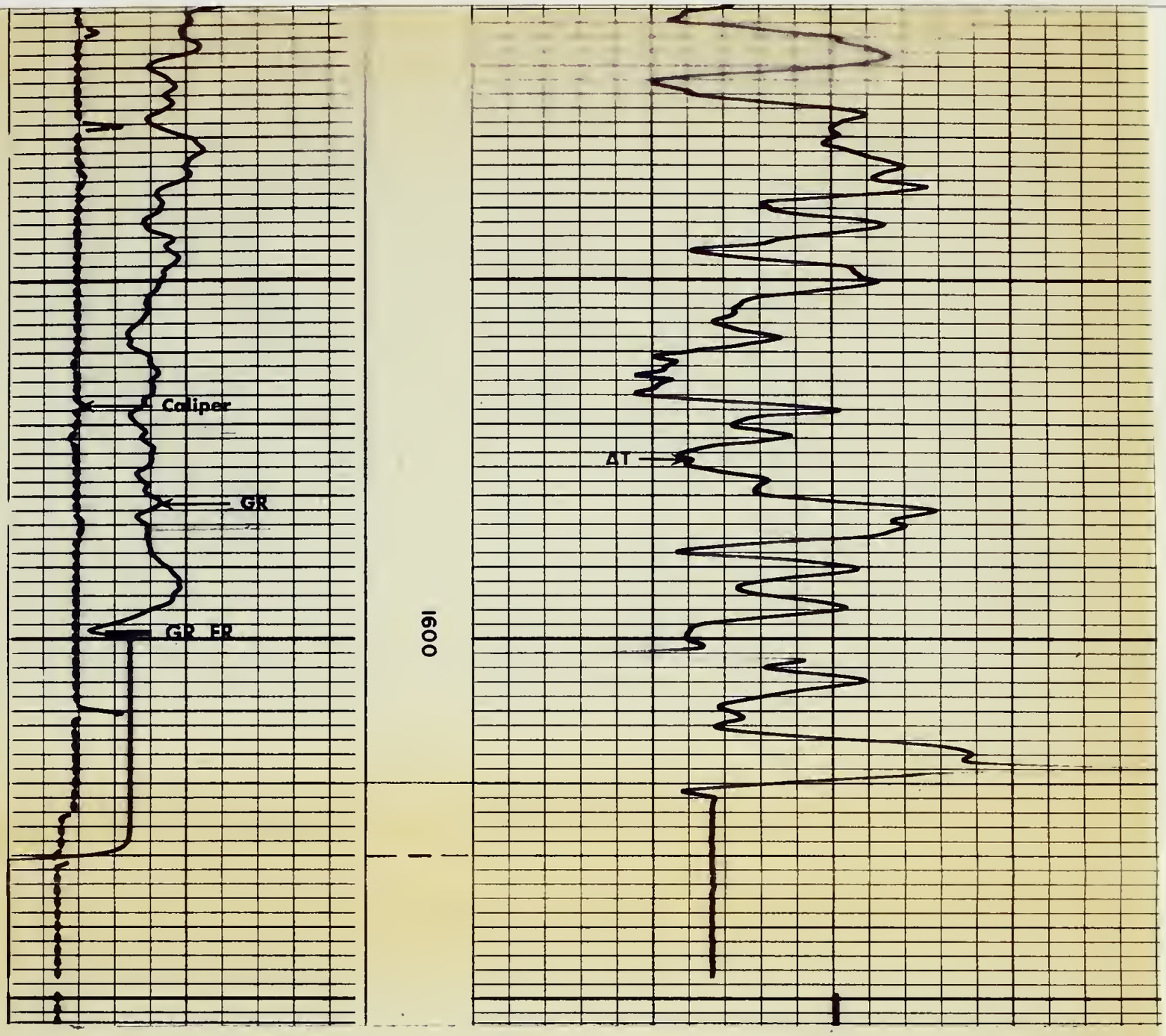
900

1000

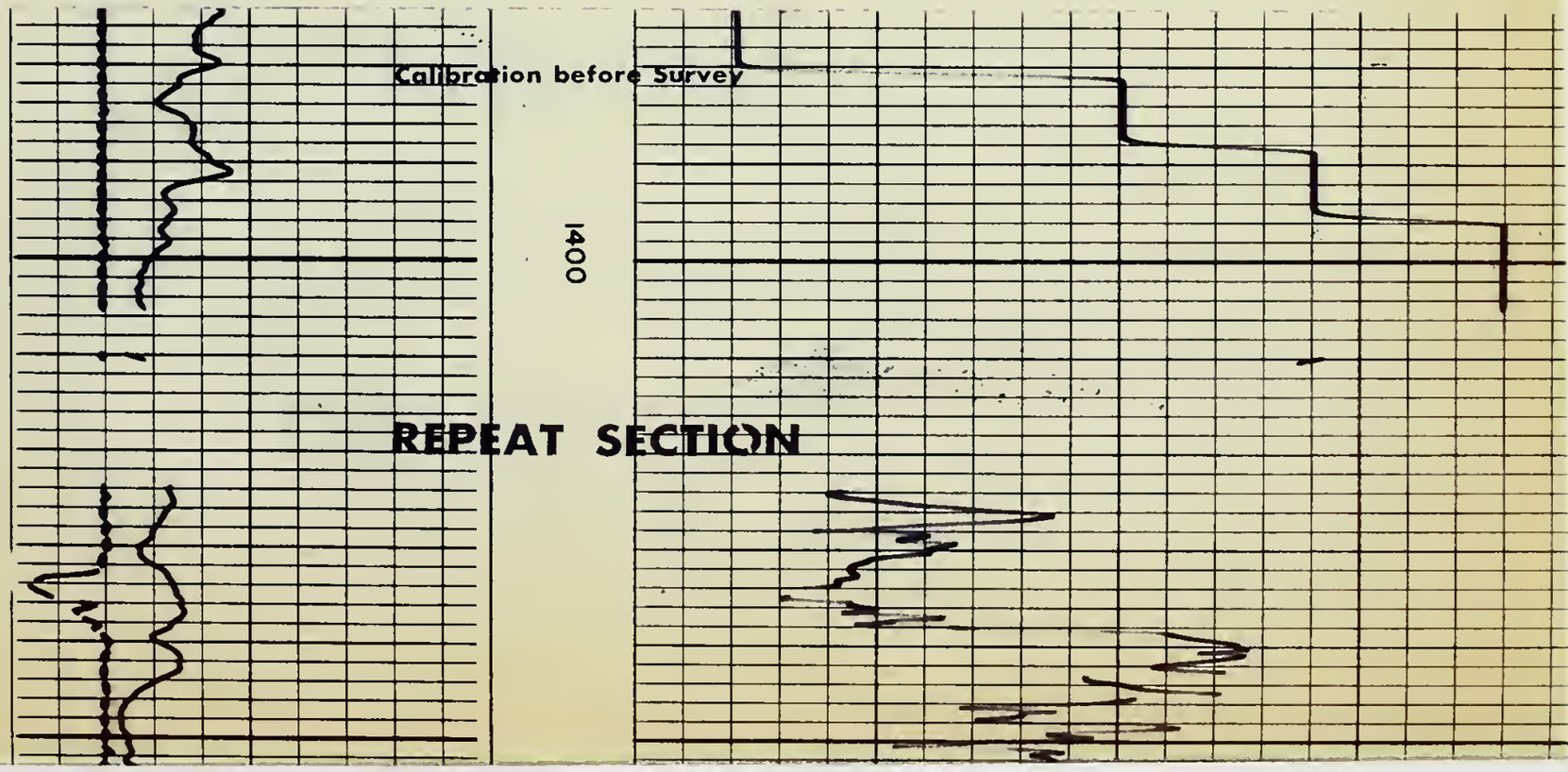
1100

1200


1300
1400
1500




Calibration before Survey




REPEAT SECTION

GR FR

1500

1600

DEPTH

**GAMMA RAY** API UNITS

0 — 150

**CALIPER** DIAM. IN INCHES

6 — 16

SINGLE T REC

460 — 260

GAMMA RAY

0 — 150

**INTERVAL TRANSIT TIME** MICROSECONDS PER FOOT T 3 R1 2 R2

150 — 100 — 50

**AMPLITUDE** MILLIVOLTS

0 — 20

**VARIABLE DENSITY**

MICROSECONDS

200 — 1200

0 150

CUT

GR

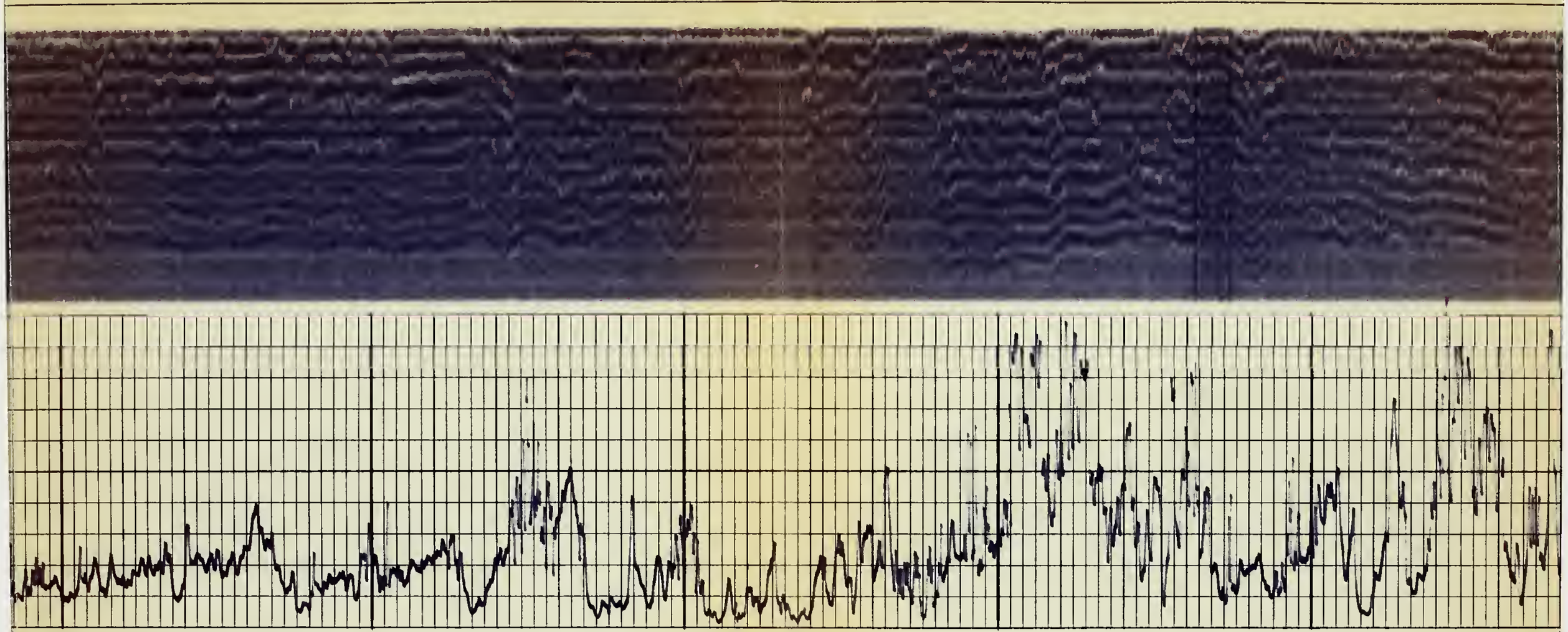
ΔT

400

Calibration before Survey

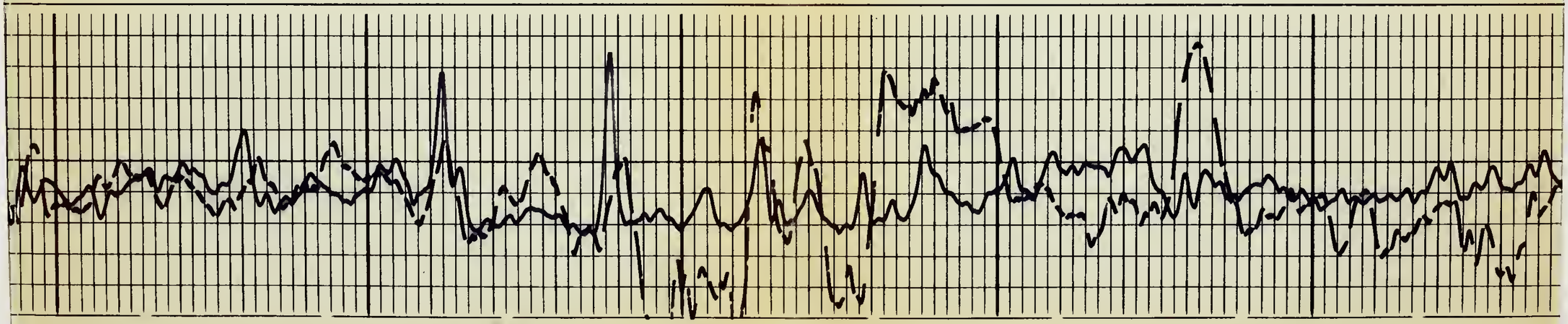
Amplitude Curve

500



600

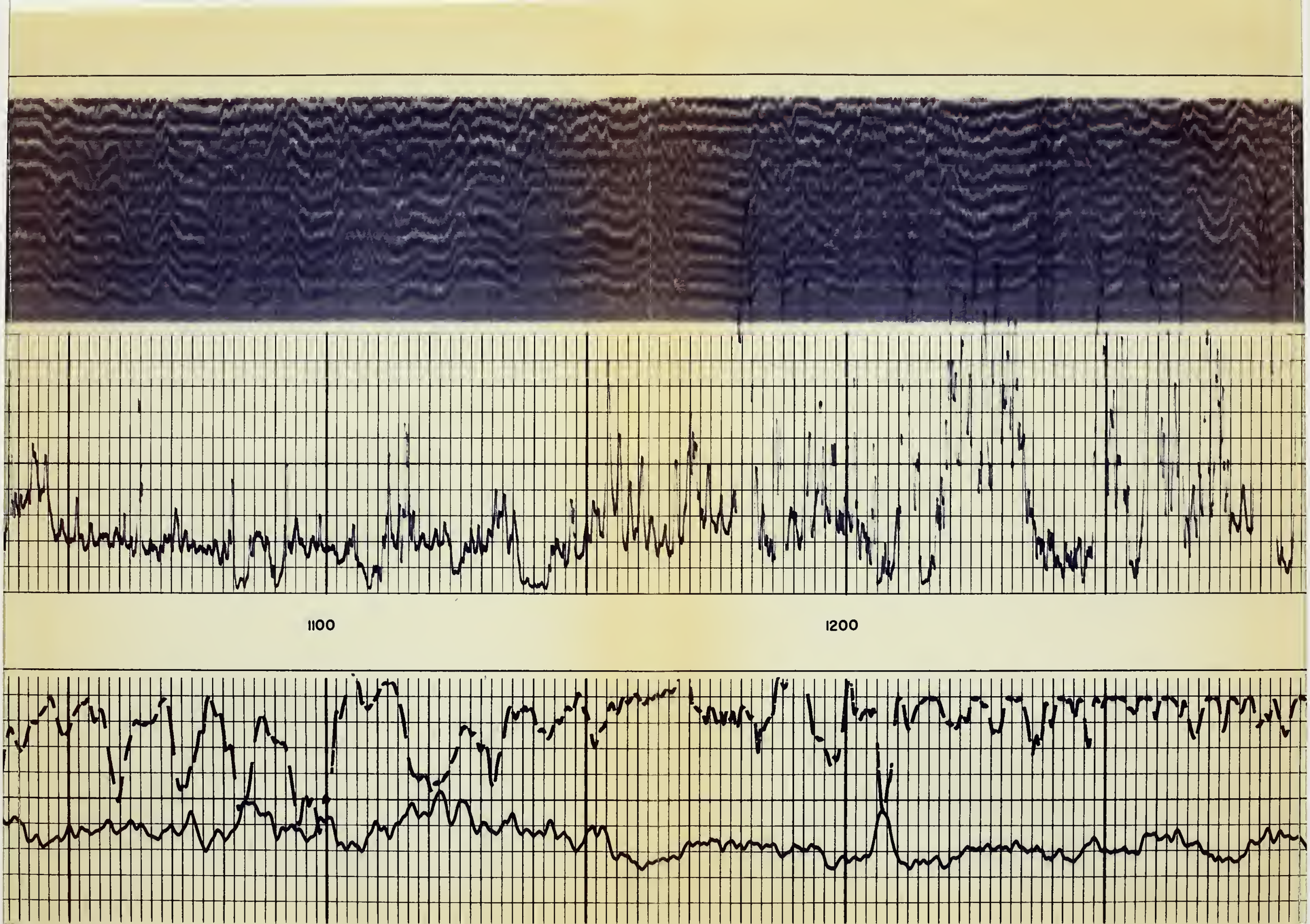
700



800

900

1000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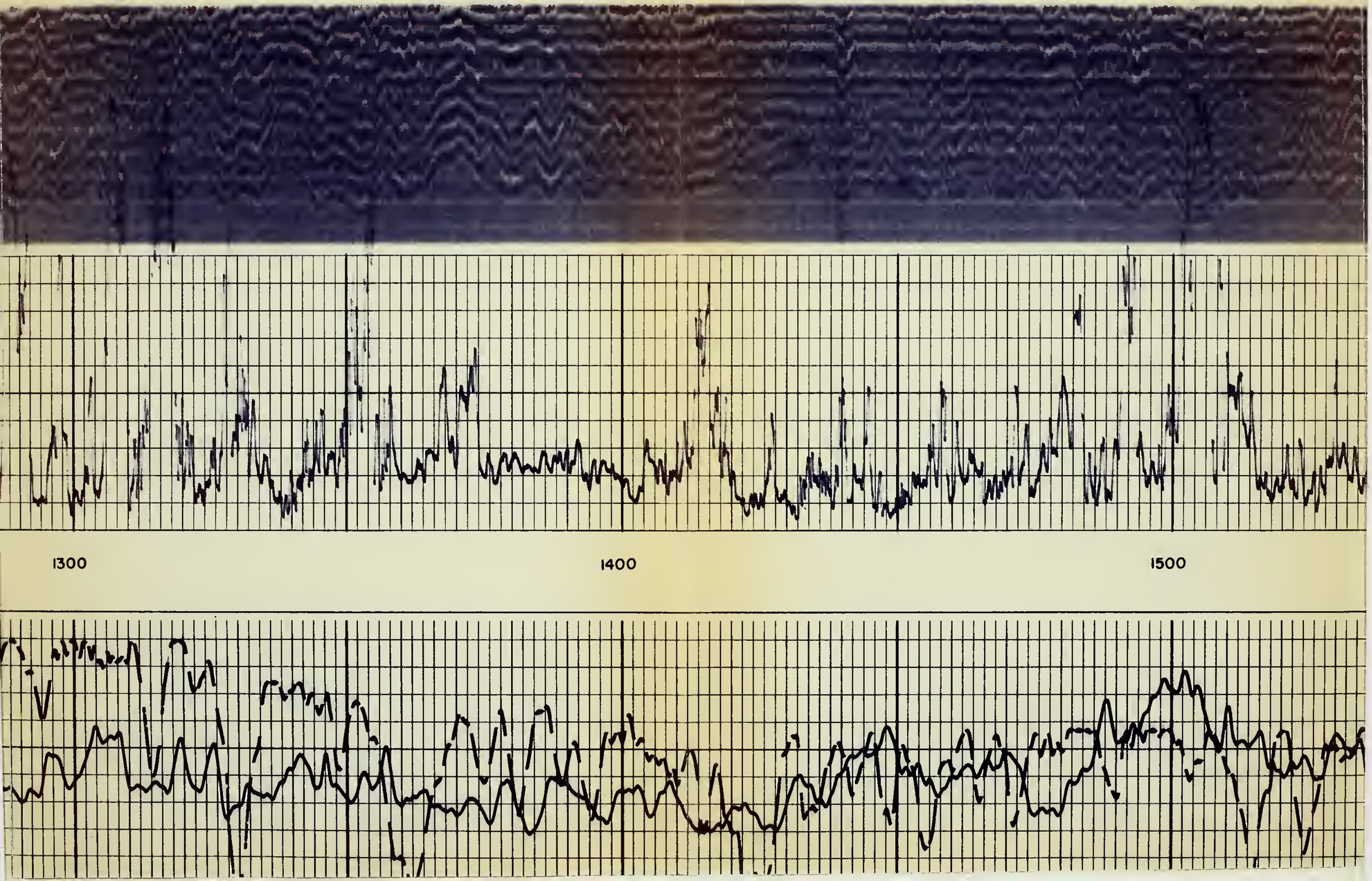
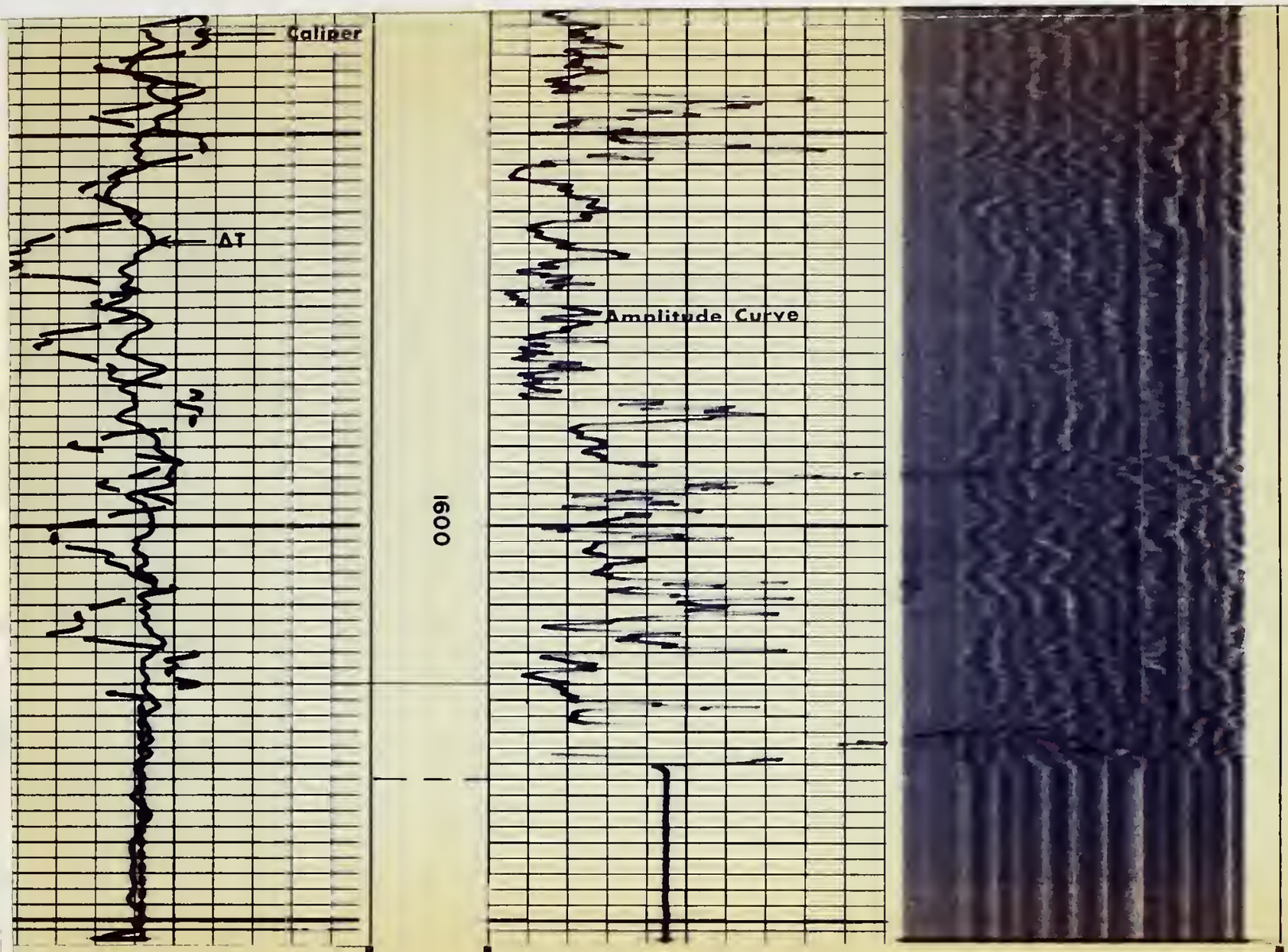
1200


1300
1400
1500




SINGLE T REC
0 260
GAMMA RAY
150

**AMPLITUDE** MILLIVOLTS
0 20

**VARIABLE DENSITY**
MICROSECONDS
200 1200

COMPANY ATLANTIC RICHFIELD

WELL SORGHUM GULCH 1-D

FIELD --

COUNTY RIO BLANCO STATE COLORADO

SCHL. FR 1620
SCHL. TD 1632
DRLR TD 1640
Elev:
KB 6903
DF 6903
GL 6903

Schlumberger

# COMPENSATED FORMATION DENSITY LOG

Gamma-Gamma

COUNTY RIO BLANCO
FIELD or LOCATION --
WELL SORGHUM 1-D
COMPANY ATLANTIC RICHFIELD

COMPANY ATLANTIC RICHFIELD ET AL
WELL SORGHUM GULCH 1-D
FIELD
COUNTY RIO BLANCO STATE COLORADO

Location:
1515 W LINE 1511 S LINE
Sec. 7 Twp. 3S Rge. 96W

Other Services:
DIL, BHC, CNL, GR, TEMP

Permanent Datum: GL ; Elev.: 6903
Log Meosured From GL , 0 Ft. Above Perm. Datum
Drilling Meosured From GL

Elev.: K.B.
D.F.
G.L. 6903

| | | | | |
|---|---|---|---|---|
| Dote | 7/28/74 | | | |
| Run No. | ONE | | | |
| Depth—Driller | 1640 | | | |
| Depth—Logger | 1632 | | | |
| Btm. Log Interval | 1631 | | | |
| Top Log Interval | 60 | | | |
| Casing—Driller | 8 5/8 @ 60 | @ | @ | @ |
| Casing—Logger | 60 | | | |
| Bit Size | 7 7/8 | | | |
| Type Fluid in Hole | AIR MIST | | | |
| Fluid Level | | | | |
| Dens. / Visc. | -- / -- | | | |
| pH / Fluid Los | -- / -- ml | ml | ml | ml |
| Source of Sample | -- | | | |
| $R_m$ @ Meas. Temp. | -- @ -- °F | @ °F | @ °F | @ °F |
| $R_{mf}$ @ Meas. Temp. | -- @ -- °F | @ °F | @ °F | @ °F |
| $R_{mc}$ @ Meas. Temp. | -- @ -- °F | @ °F | @ °F | @ °F |
| Source: $R_{mf}$ / $R_{mc}$ | -- / -- | | | |
| $R_m$ @ BHT | -- @ -- °F | @ °F | @ °F | @ °F |
| Time Since Circ. | 10 HRS | | | |
| Max. Rec. Temp. | 80 °F | °F | °F | °F |
| Equip. / Location | 7674 / VERN | | | |
| Recorded By | STRAWN | | | |
| Witnessed By | MR. TAIT | | | |

FOLD HERE

The well name, location and borehole reference data were furnished by the customer.

SWS-1381-G

## SCALE CHANGES

| Type Log | Depth | Scale Up Hole | Scale Down Hole |
|---|---|---|---|
| | | | |

## CHANGES IN MUD TYPE OR ADDITIONAL SAMPLES

| | | | |
|---|---|---|---|
| Dote / Sample No. | | | |
| Depth - Driller | | | |
| Type Fluid | | | |
| Source of Sample | | | |
| $R_m$ @ Meas. Temp. | @ °F | @ °F | @ °F |
| $R_{mf}$ @ Meas. Temp. | @ °F | @ °F | @ °F |
| $R_{mc}$ @ Meas. Temp. | @ °F | @ °F | @ °F |
| $R_m$ @ BHT | @ °F | @ °F | @ °F |
| Dens. / Visc. | / ml | ml | ml |
| ph / Fluid Loss | / ml | ml | ml |
| % Water by Vol. | | | |
| % Oil by Vol. | | | |
| % Solids by Vol. | | | |
| Solids Av. Sp. Gr. | | | |

## LOGGING DATA

FDC Selectors

| Grain Density | Hole Fluid | Porosity Scale | From | To |
|---|---|---|---|---|
| 2.71 | LIQ. | 45% | 60 | 1640 |

| Liquid Density |
|---|
| 1.0 |

## REMARKS

Service Order No. -
API Serial No. - 7108

## EQUIPMENT DATA

| | |
|---|---|
| Run No. | ONE |
| Panel No. | 355 |
| Cort No. | 333 |
| Skid No. | 549 |
| Sonde No. | 238 |
| Source | 2940 |
| Colibrator | 545 |
| GR Cort. | 98 |
| TTR | -- |
| Mem Panel | 173 |

## BIT SIZE/CASING DATA

| Bit | From | To | Csg. Size | Csg. Wt. | From | To |
|---|---|---|---|---|---|---|
| | | | | | | |

## CALIBRATION DATA

| Run No. | Gamma Ray | | | FDC — Before Lag — ACPS | | FDC — After Lag — ACPS | |
|---|---|---|---|---|---|---|---|
| | API Scale | Background CPS | Total CPS | $P_1$ | $P_2$ | $P_1$ | $P_2$ |
| 1 | 0-130 | 60 | 160 | 432 | 720 | 440 | 720 |
| 2 | | | | | | | |
| 3 | | | | | | | |
| 4 | | | | | | | |

All interpretations are opinions based on inferences from electrical or other measurements and we cannot, and do not guarantee the accuracy or correctness of any interpretations, and we shall not, except in the case of gross or willful negligence on our part, be liable or responsible for any loss, costs, damages or expenses incurred or sustained by anyone resulting from any interpretation made by any of our officers, agents or employees. These interpretations are also subject to Clause 7 of our General Terms and Conditions as set out in our current Price Schedule.

**CALIPER**
HOLE DIAM. IN INCHES

6" — 16"

DEPTHS

—.25 — 0 — +.25

**CORRECTION**
GRAMS/CC.

**GAMMA RAY**
API UNITS

0 — 150

**BULK DENSITY**
GRAMS CC.

1.7 — 2.2 — 2.7

RATIO

5.0 — 2.5

0010

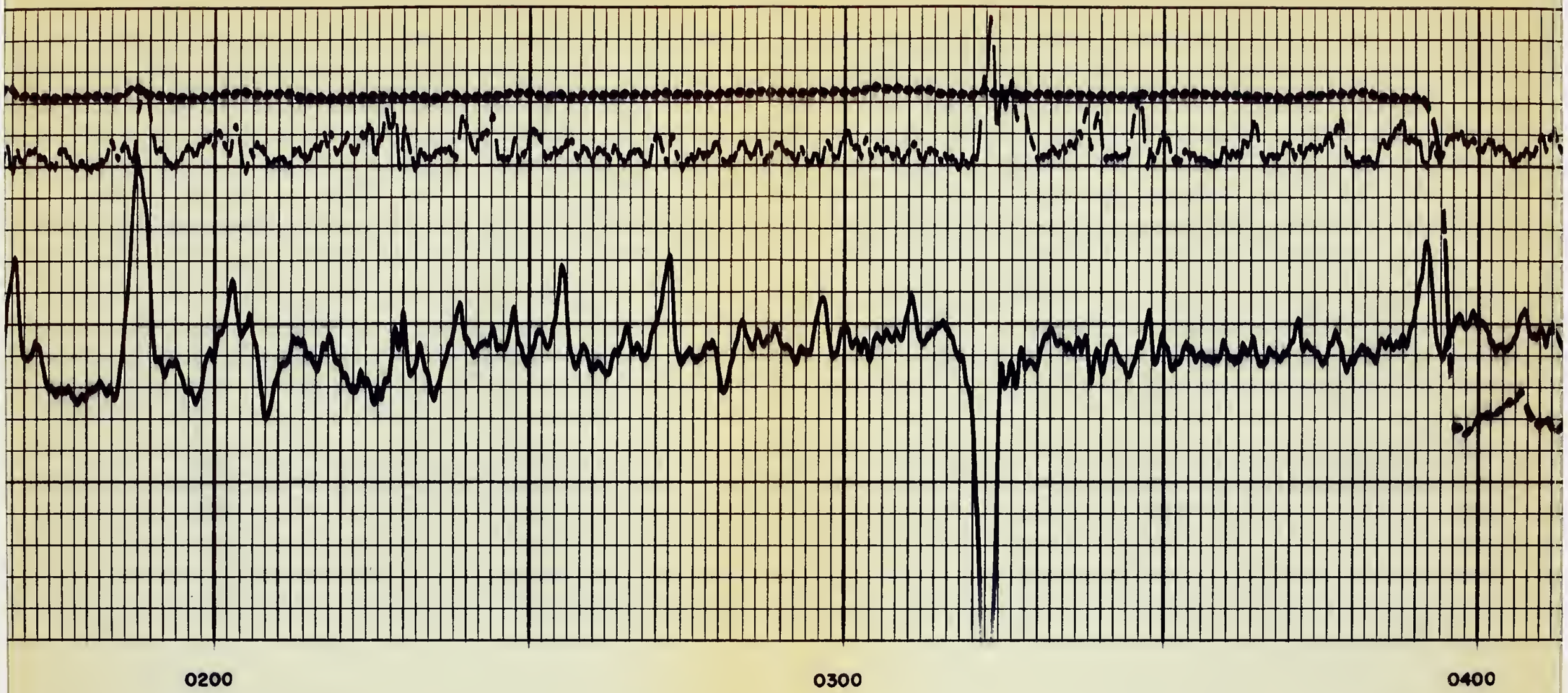
Gamma Ray

Caliper Curve

COMPENSATION

BULK DENSITY

RATIO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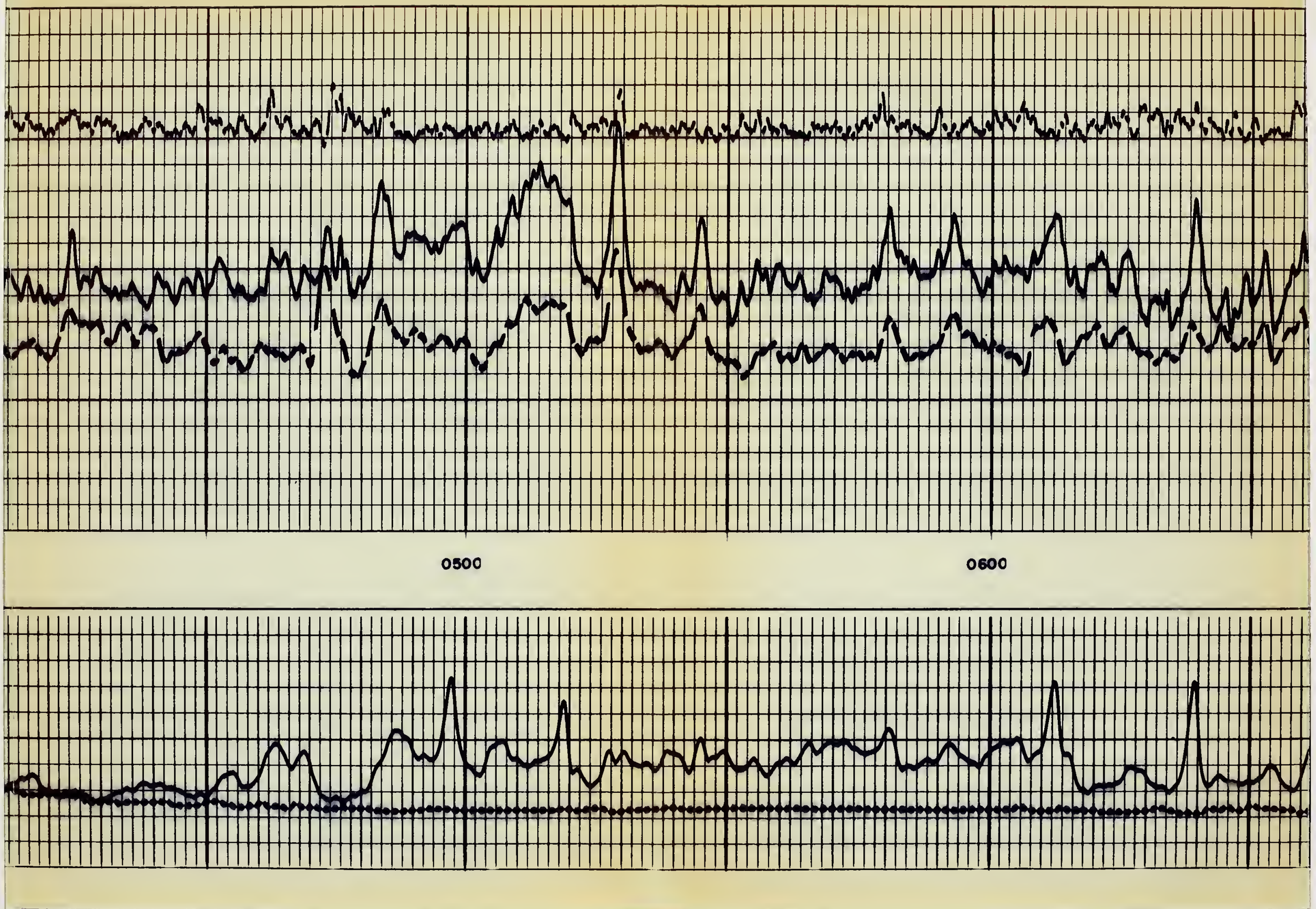
0300
0400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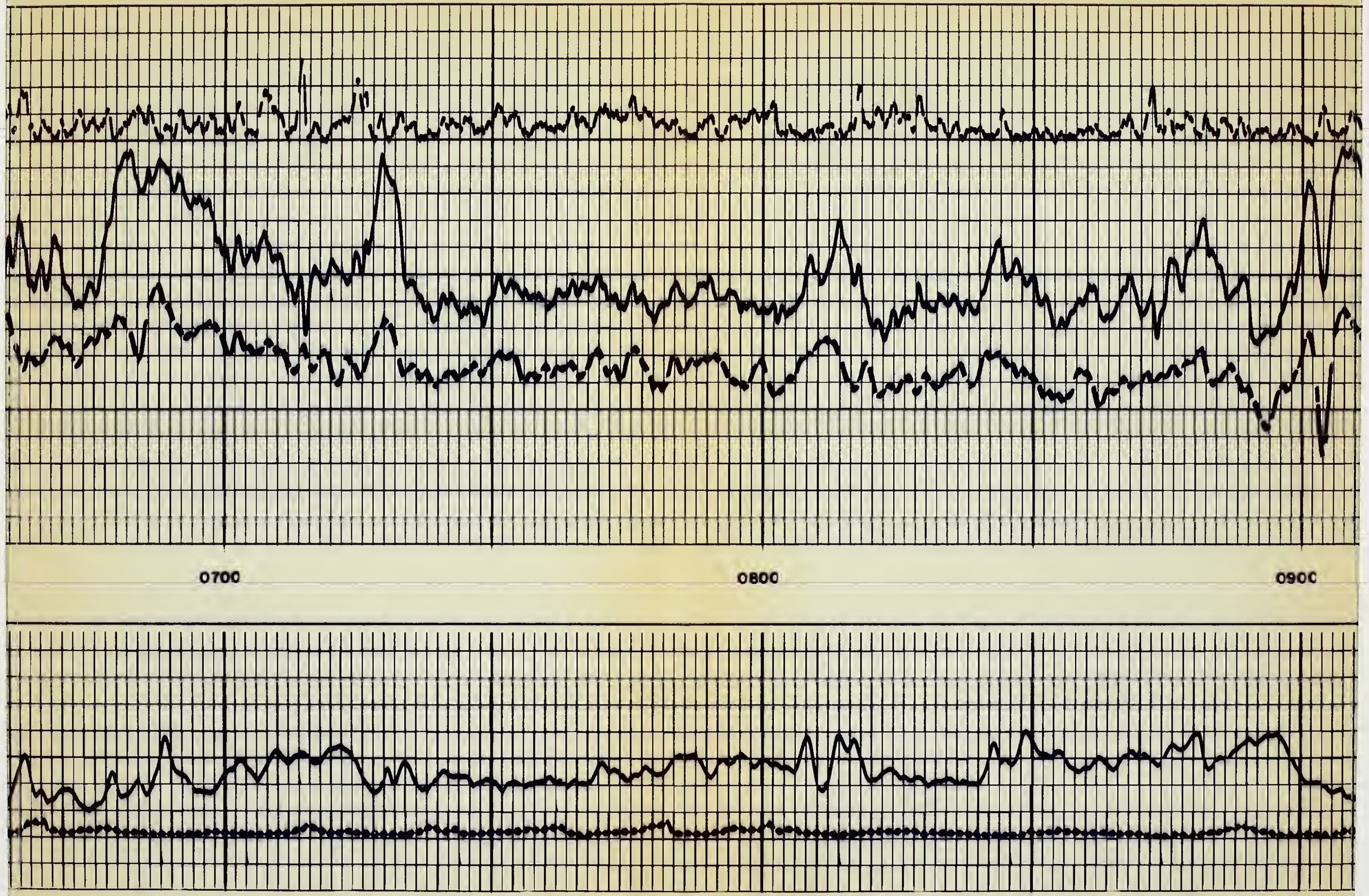
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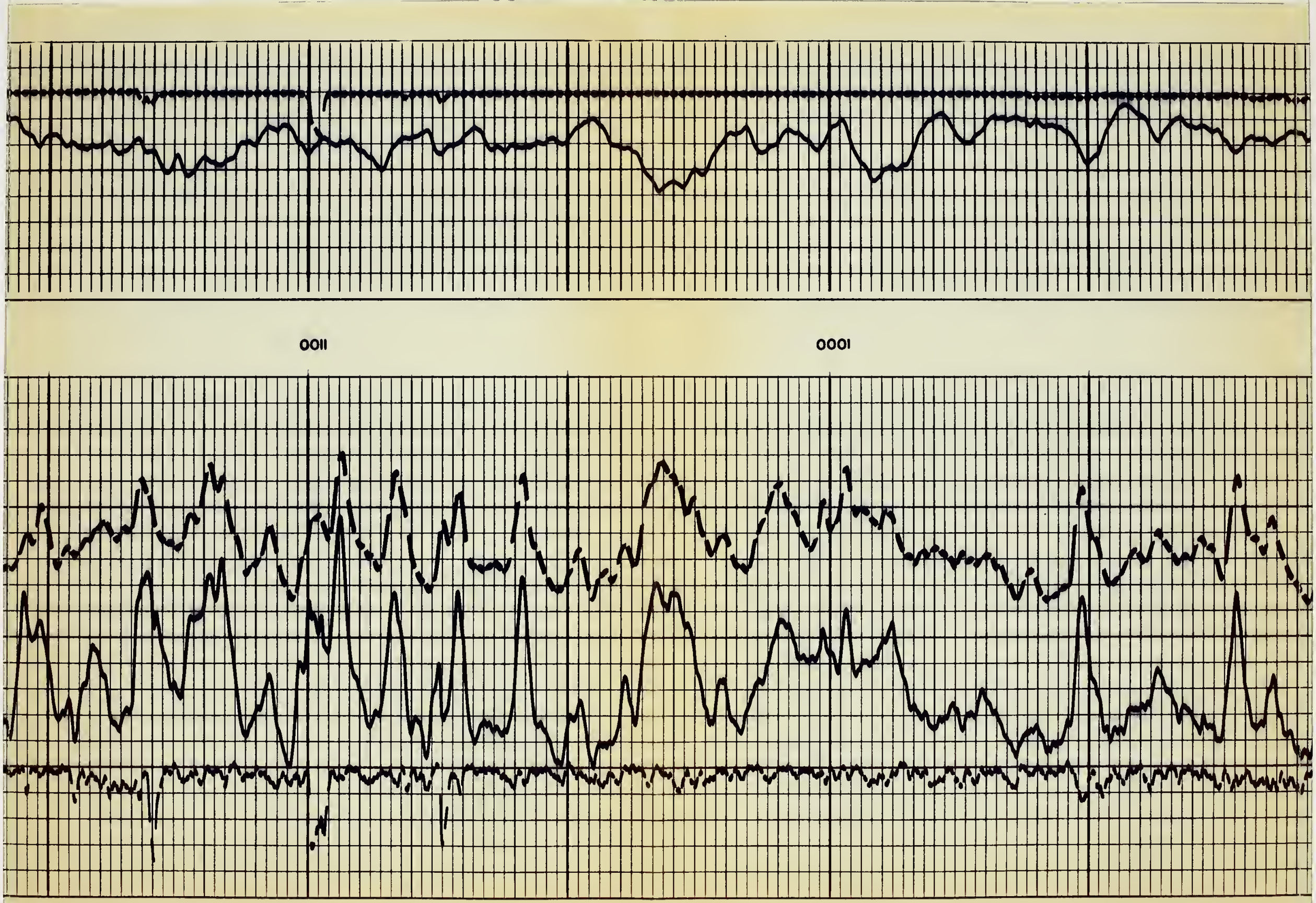
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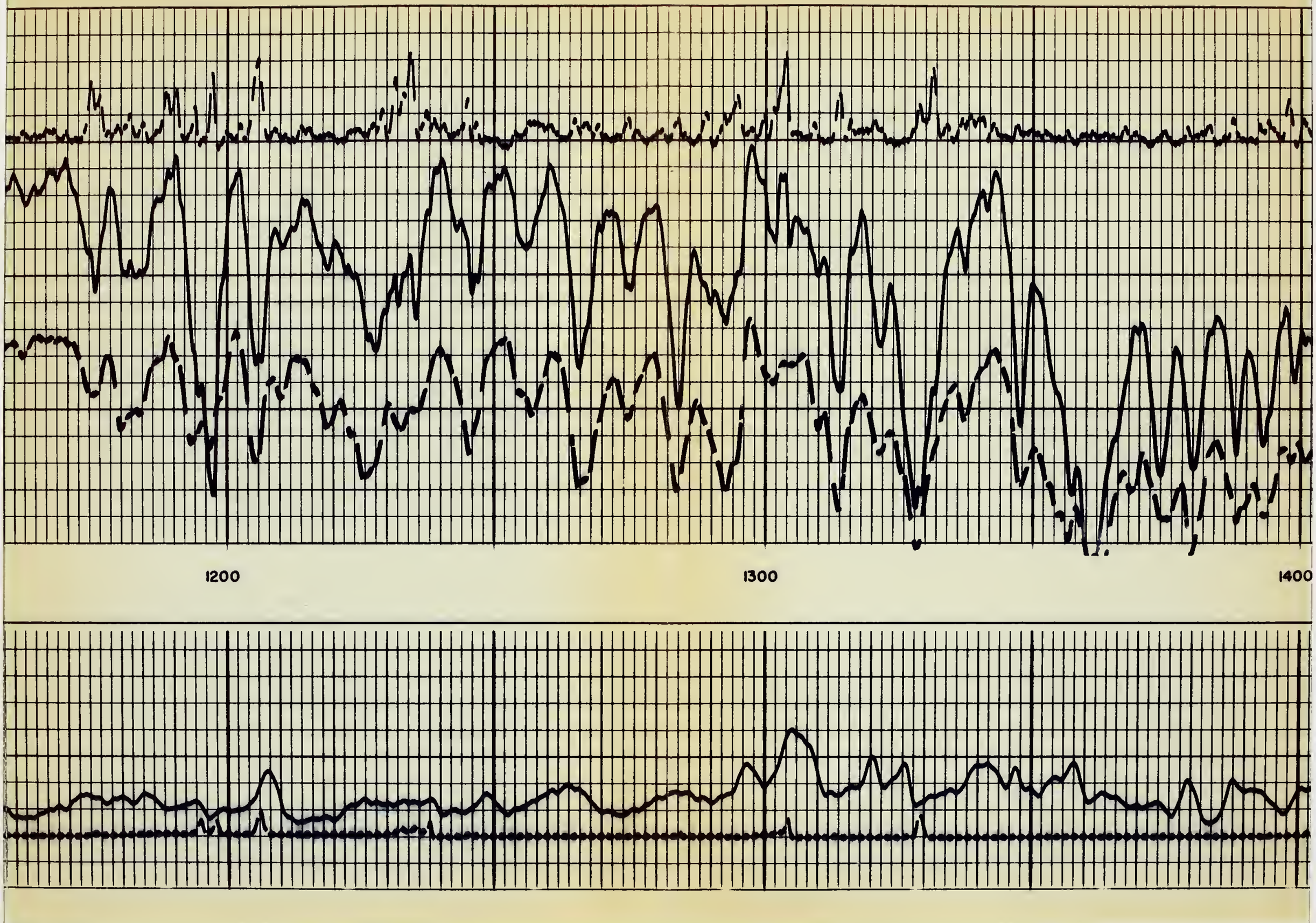
0001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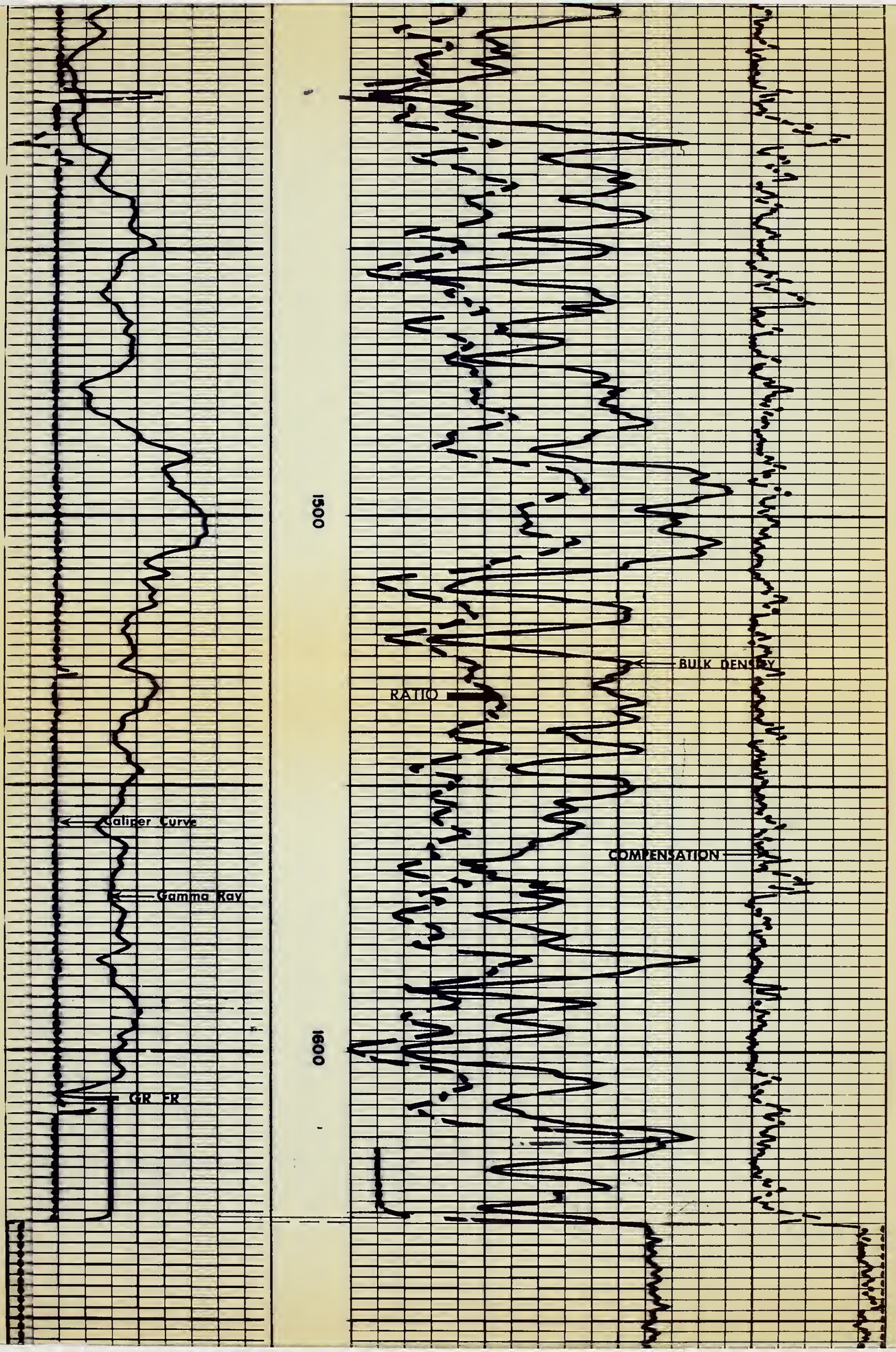
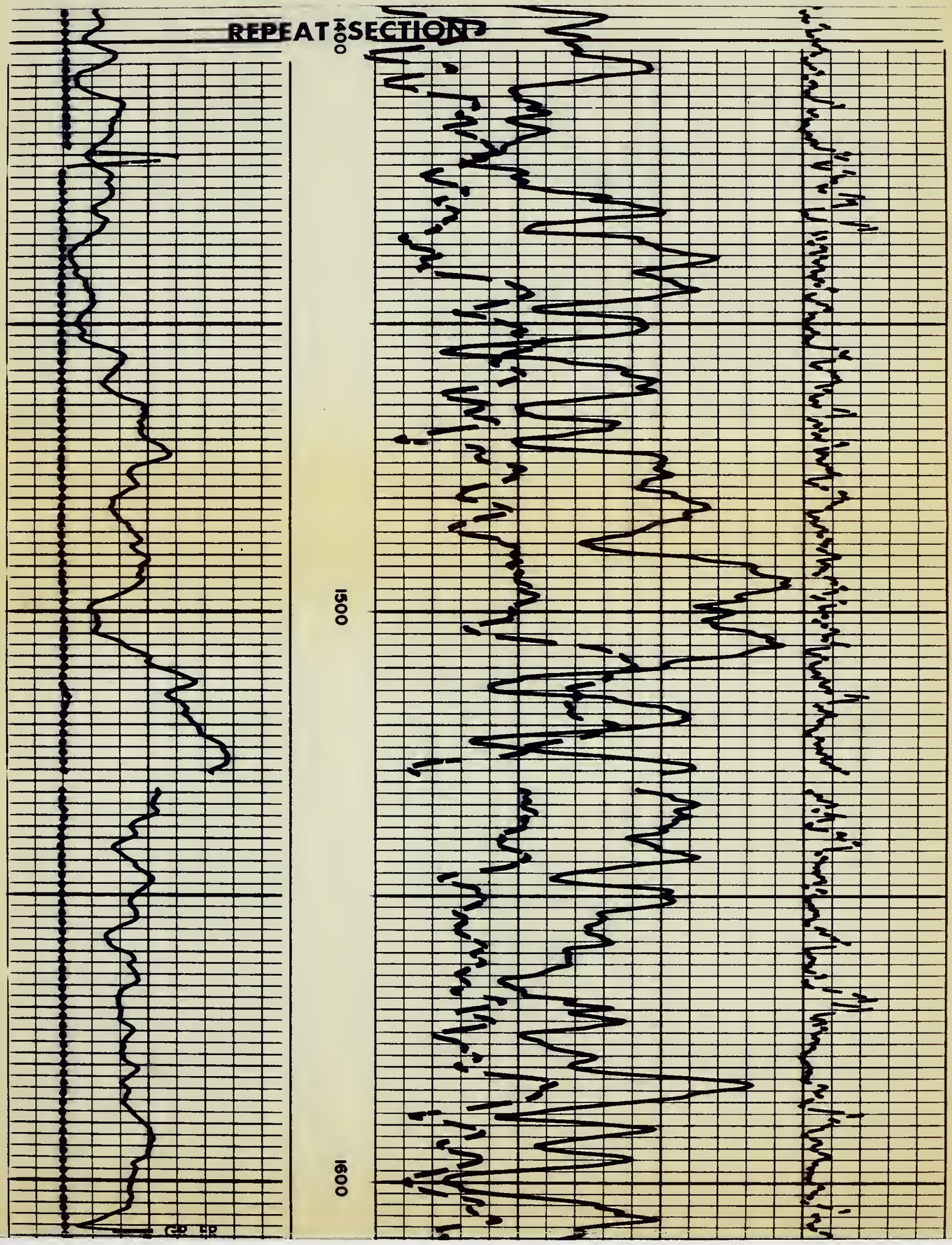
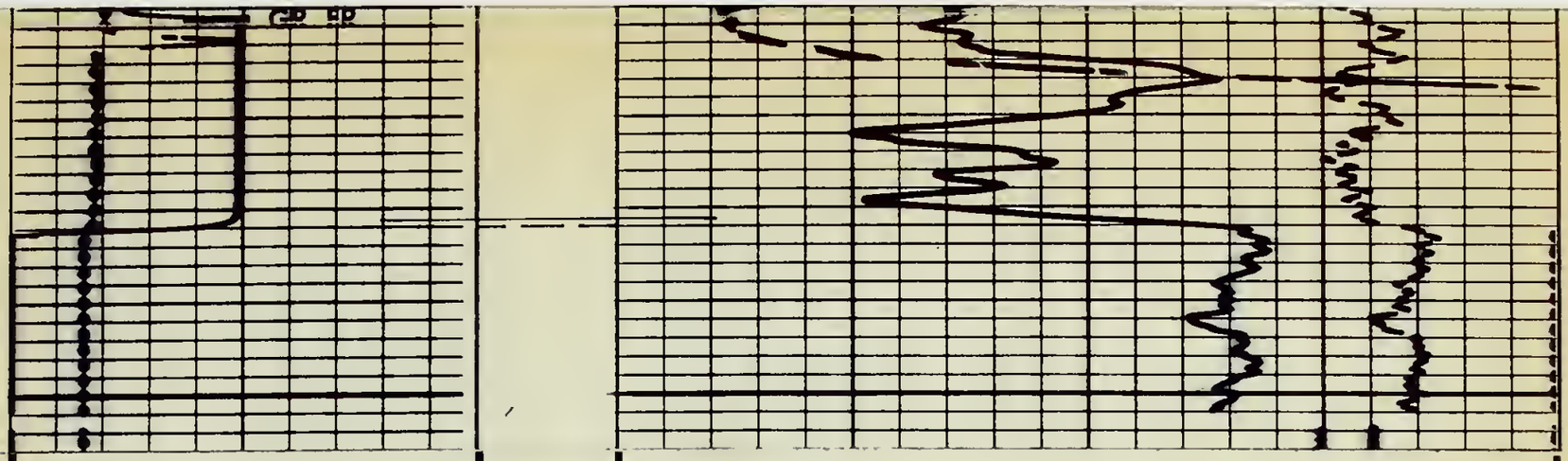
1300
1400


1500
1600
Caliper Curve
Gamma Ray
GR FR
RATIO
BULK DENSITY
COMPENSATION


REPEAT SECTION
1600
1500



0 150

**GAMMA RAY**
API UNITS

1.7 2.2 2.7

RATIO

5.0 2.5 0

**BULK DENSITY**
GRAMS/CC.

6" 16"

**CALIPER**
HOLE DIAM. IN INCHES

DEPTHS

−.25 0 +.25

**CORRECTION**
GRAMS/CC.

COMPANY ATLANTIC RICHFIELD

WELL SORGHUM 1-D

FIELD

COUNTY RIO BLANCO STATE COLORADO

Rm -- @ -- °F

BHT °F

SCHL. FR

SCHL. TD

DRLR TD

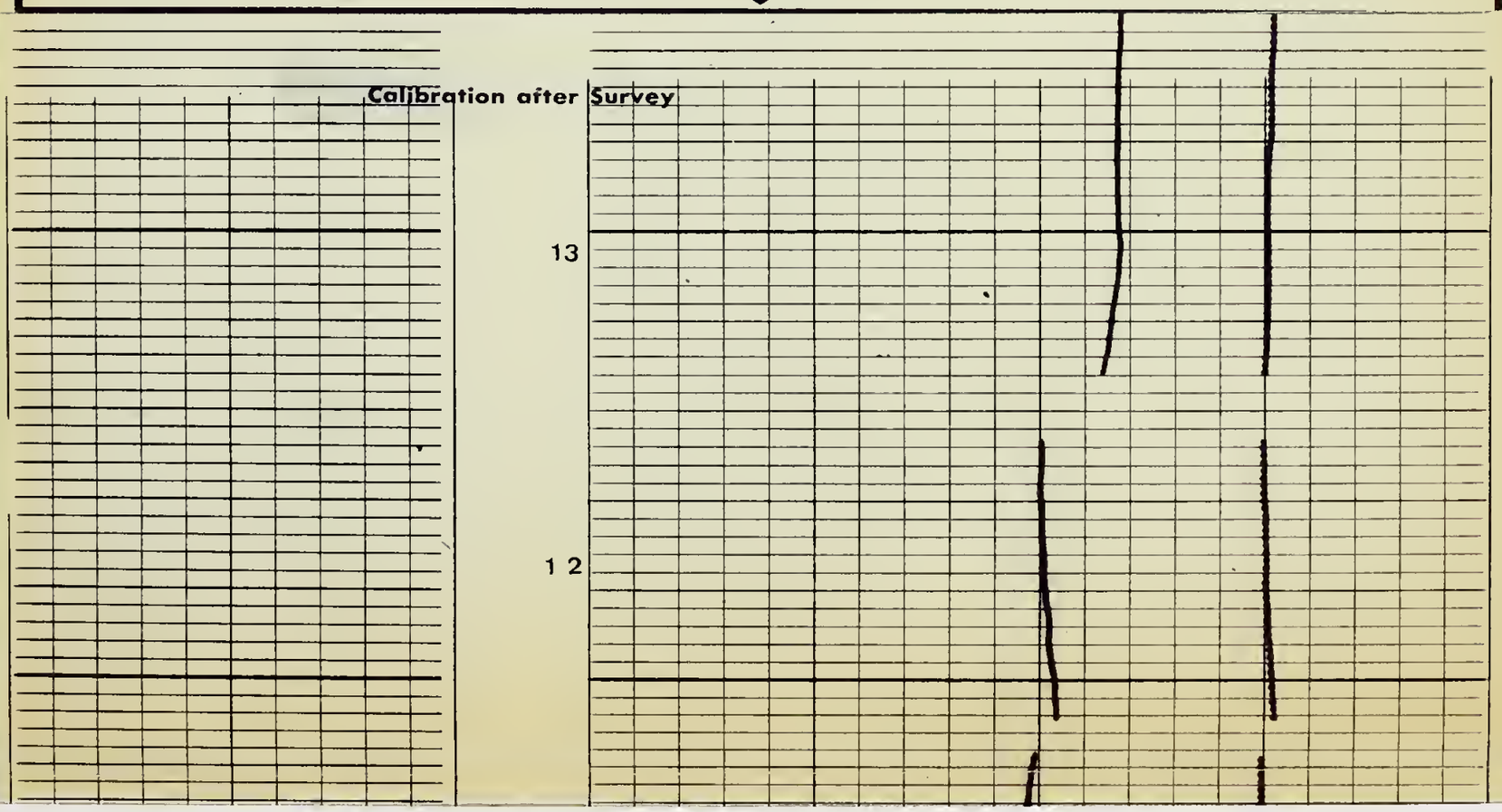
Elev:

KB

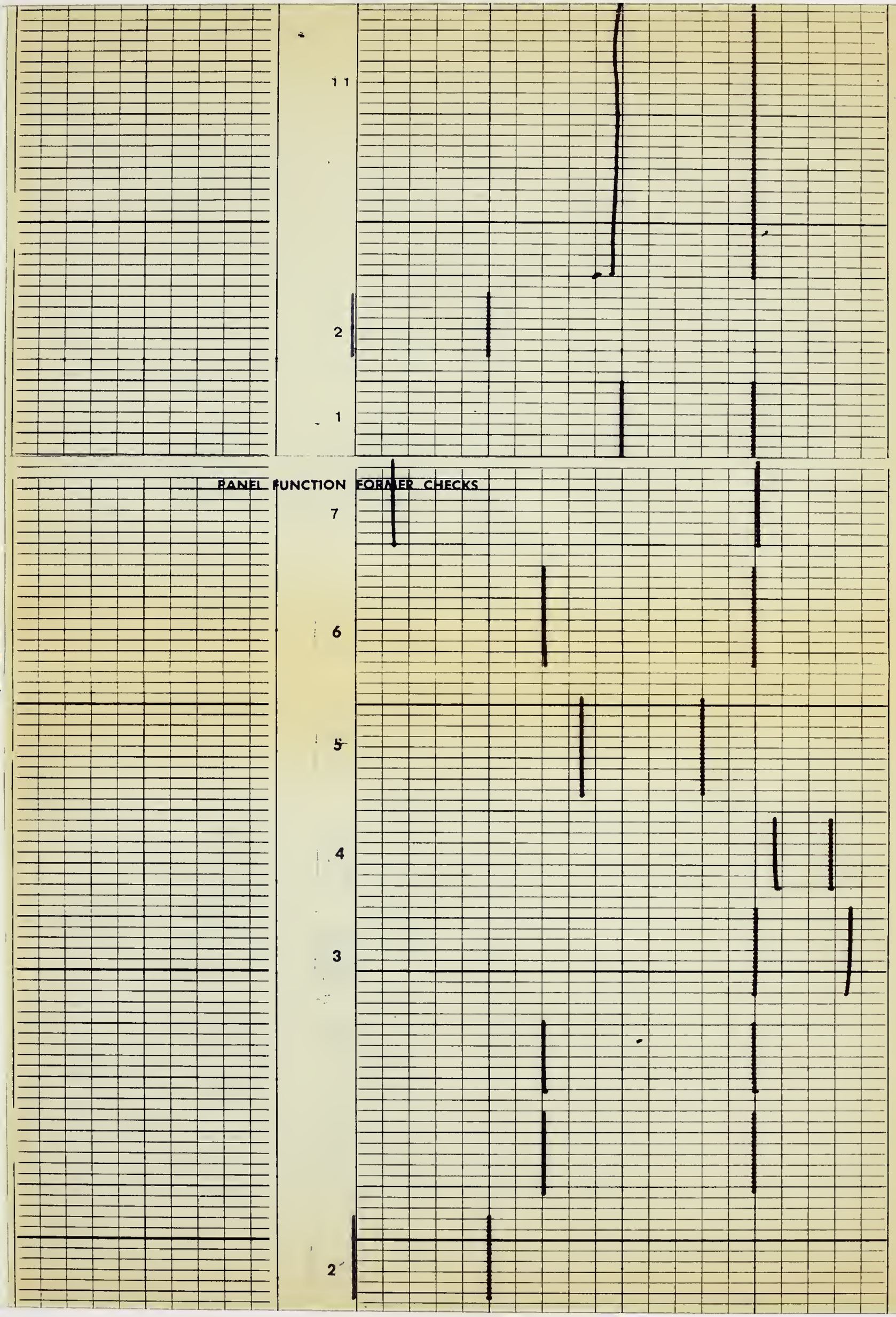
DF

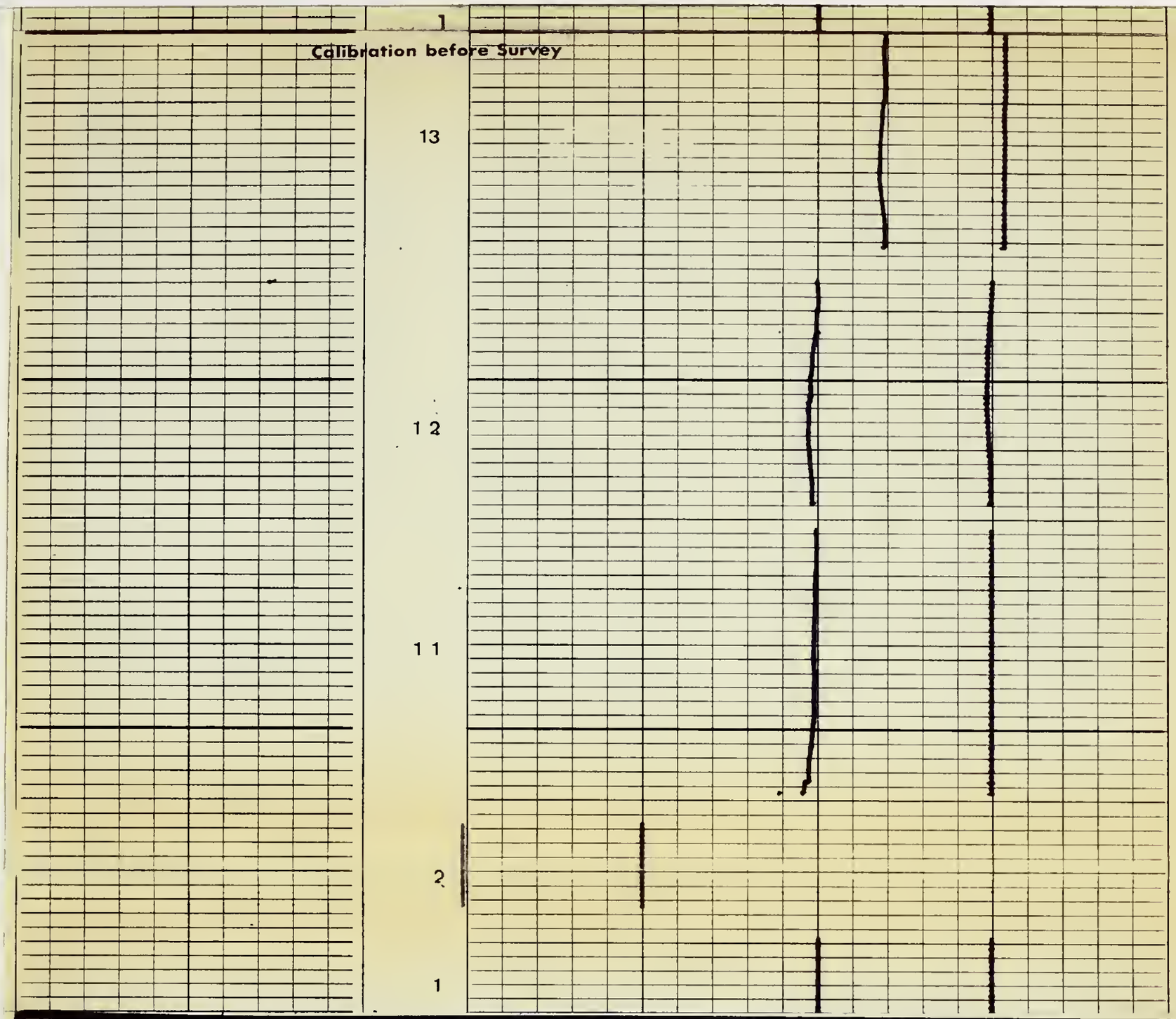
GL 6903

## CALIBRATION RECORD



PANEL FUNCTION FORMER CHECKS






## FORMATION DENSITY COMPENSATED CALIBRATION CODING

1. MECHANICAL ZERO
2. RECORDER SENSITIVITY

PANEL TEST

FDC LIQUID

| | POS | $\rho$ | $\triangle\rho$ |
|---|---|---|---|
| 3. | # 1 | 2.92 | .00 |
| 4. | # 2 | 2.78 | +.14 |
| 5. | # 3 | 2.42 | −.10 |
| 6. | # 4 | 2.35 | .00 |
| 7. | # 5 | 2.08 | .01 |

8. MECHANICAL ZERO CALIPER
9. 8" RING
10. 12" RING
11. TOOL CALIBRATE #1 SET $\rho = 2.50$
12. TOOL CALIBRATE #2 SET $\triangle\rho = .00$
13. LOG POSITION $\rho = 2.59$, $\triangle\rho = .015$

## CALIBRATION RECORD

COMPANY ATLANTIC RICHFIELD

WELL SORGHUM 1-D

FIELD

COUNTY RIO BLANCO STATE COLORADO

Rm -- @ -- °F

BHT °F

SCHL. FR

SCHL. TD

DRLR TD

Elev:

KB

DF

GL 6903

Schlumberger

# DUAL INDUCTION - LATEROLOG
## WITH LINEAR CORRELATION LOG

COUNTY RIO BLANCO
FIELD or LOCATION
WELL SORGHUM GULCH 1-D
COMPANY ATLANTIC RICHFIELD

COMPANY ATLANTIC RICHFIELD ET AL
WELL SORGHUM GULCH 1-D
FIELD --
COUNTY RIO BLANCO STATE COLORADO

Location. API Seriol No. 7108
1515 W LINE 1511 S LINE
Sec. 7 Twp. 3S Rge. 96W

Other Services:
BHC, FDC, CNL, GR, TEMP.

Permanent Datum: GL ; Elev.:
Log Meosured From GL , 0 Ft. Above Perm. Datum
Drilling Meosured From GL

Elev.: K.B. 6903
D.F. 6903
G.L. 6903

| | | | | |
|---|---|---|---|---|
| Date | 7/28/74 | | | |
| Run No. | ONE | | | |
| Depth—Driller | 1640 | | | |
| Depth—Logger | 1630 | | | |
| Btm. Log Interval | 1624 | | | |
| Top Log Interval | 60 | | | |
| Casing—Driller | 8 5/8 @ 60 | @ | @ | @ |
| Casing—Logger | 60 | | | |
| Bit Size | 7 7/8 | | | |
| Type Fluid in Hole | | | | |
| Fluid Level | AIR MIST | | | |
| Dens. / Visc. | -- / -- | | | |
| pH / Fluid Loss | -- / -- ml | ml | ml | ml |
| Source of Sample | -- -- | | | |
| $R_m$ @ Meas. Temp. | -- @ -- °F | @ °F | @ °F | @ °F |
| $R_{mf}$ @ Meas. Temp. | -- @ -- °F | @ °F | @ °F | @ °F |
| $R_{mc}$ @ Meas. Temp. | -- @ -- °F | @ °F | @ °F | @ °F |
| Source: $R_{mf}$ / $R_{mc}$ | -- / -- | | | |
| $R_m$ @ BHT | -- @ 90 °F | @ °F | @ °F | @ °F |
| Time Since Circ. | 6 HOURS | | | |
| Mox. Rec. Temp. | 90 °F | °F | °F | °F |
| Equip. / Locotion | 7674 / VERN | | | |
| Recorded By | STRAWN | | | |
| Witnessed By | MR. TAIT | | | |

FOLD HERE

The well name, location and borehole reference data were furnished by the customer.

SCALE CHANGES

| Type Log | Depth | Scale Up Hole | Scale Down Hole |
|---|---|---|---|
| | | | |

CHANGES IN MUD TYPE OR ADDITIONAL SAMPLES

| | | | |
|---|---|---|---|
| Date / Sample No. | | | |
| Depth - Driller | | | |
| Type Fluid in Hole | | | |
| Dens. / Visc. | | | ml |
| pH / Fluid Loss | | ml | |
| Source of Sample | | | |
| $R_m$ @ Meas. Temp. | @ °F | @ °F | @ °F |
| $R_{mf}$ @ Meas. Temp. | @ °F | @ °F | @ °F |
| $R_{mc}$ @ Meas. Temp. | @ °F | @ °F | @ °F |
| Source: $R_{mf}$ / $R_{mc}$ | — | — | — |
| $R_m$ @ BHT | @ °F | @ °F | @ °F |
| $R_{mf}$ @ BHT | @ °F | @ °F | @ °F |
| $R_{mc}$ @ BHT | @ °F | @ °F | @ °F |

REMARKS

Service Order No. - 7108

☒ Surface determined sonde errors used for 6FF40.
☐ 6FF40 sonde error corrected for ____ inch borehole signal at $R_m$ = ____
☐ 6FF40 zero set in hole at depth of ____ feet.

EQUIPMENT DATA

| | |
|---|---|
| Run No. | ONE |
| Panel No. | 322 |
| Cart. No. | 234 |
| Sonde No. | 169 |
| Mem. Panel No. | 172 |
| G.R. Cart No. | 98 |
| G.R. Panel No. | 173 |
| TTR No. | --- |
| Cent. Device | YES |
| Stand off - Inches | 1 1/2 |
| Time Const. - Sec. | --- |
| Speed - F.P.M. | 60 |

CALIBRATION DATA

SWS-1608-F

| CALIBRATION: | BACKGND. CPS. | SOURCE CPS. | GALV. INCR. DIVISION | SENS. TAP (FOR CAL.) | SENS. TAP (RECORD) | TIME CONST. | |
|---|---|---|---|---|---|---|---|
| GAMMA RAY: | | | | | | | |
| | | | | | | | |

All interpretations ore opinions bosed on inferences from electricol or other meosurements ond we cannot, ond do not guorontee the occurocy or correctness of ony interpretotions, ond we shall not, except in the case of gross or willful negligence on our port, be lioble or responsible for ony loss, costs, domoges or expenses incurred or sustoined by onyone resulting from ony interpretotion mode by ony of our officers, agents or employees. These interpretotions ore olso subject to Clouse 7 of our Generol Terms ond Conditions os set out in our current Price Schedule.

## SPONTANEOUS-POTENTIAL
MILLIVOLTS

20
– |↔| +

## GAMMA RAY
API UNITS

## CONDUCTIVITY
MILLIMHOS/M = $\frac{1000}{\text{OHMS. M}^2\text{/M}}$

**DEEP INDUCTION LOG**

400 200 0

## RESISTIVITY
OHMS. M²/M

**DEEP INDUCTION LOG**

0 100

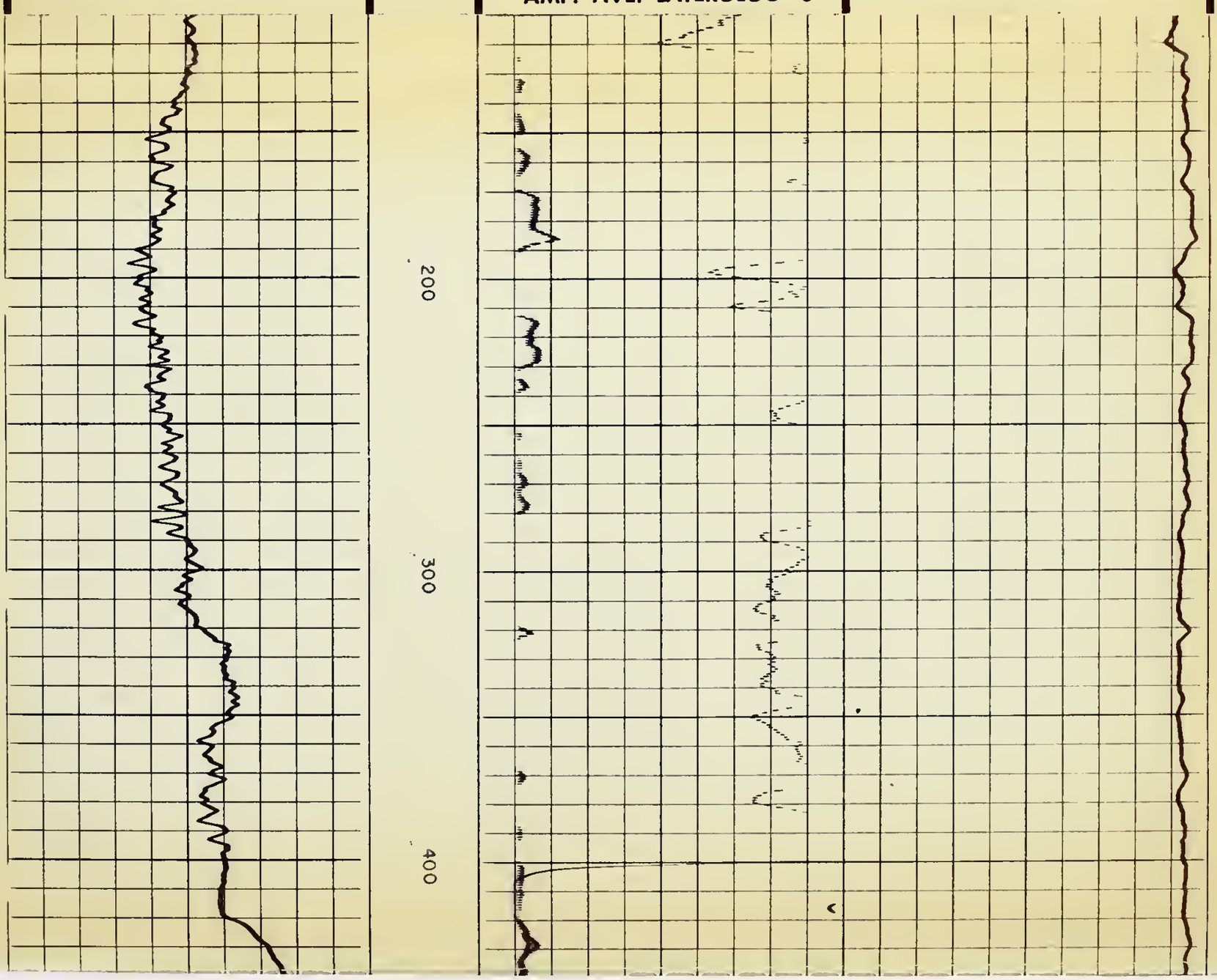
0 1000

**AVERAGED LATEROLOG - 8**

0 100

0 1000

**AMP. AVE. LATEROLOG - 8**



Conductivity

LATEROLOG - 8

DEEP INDUCTION

500

600

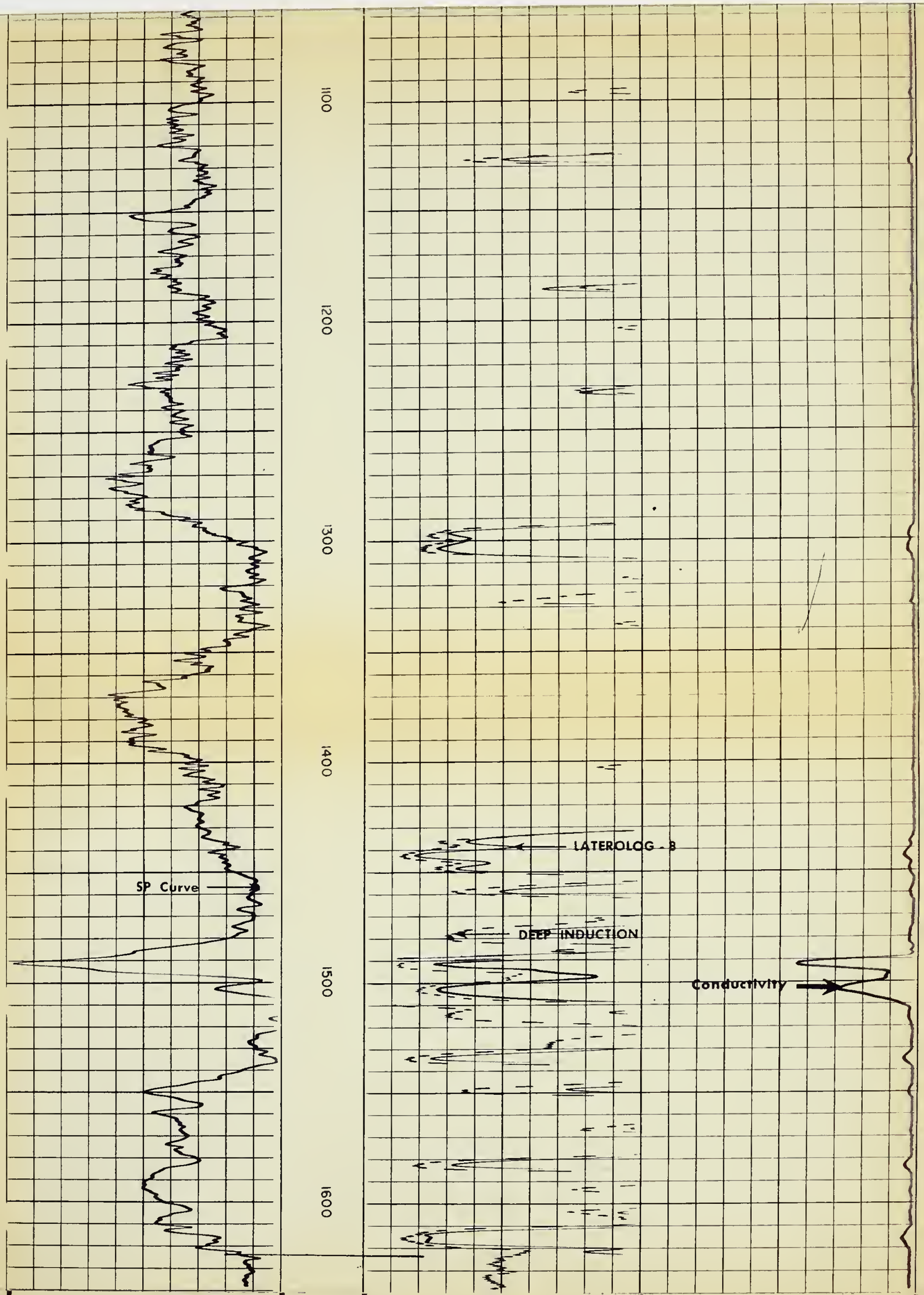
700

800

900

1000

SP Curve


1100
1200
1300
1400
1500
1600
SP Curve
LATEROLOG - 8
DEEP INDUCTION
Conductivity
GAMMA RAY
API UNITS
AMP. AVE. LATEROLOG — 8
AVERAGED LATEROLOG — 8

DEEP INDUCTION LOG

**RESISTIVITY**
OHMS. $M^2/M$

$-\left|\overset{20}{\underset{MV}{\leftrightarrow}}\right|+$

DEEP INDUCTION LOG

**SPONTANEOUS-POTENTIAL**
MILLIVOLTS

DEPTHS

**CONDUCTIVITY**
MILLIMHOS/M $= \frac{1000}{\text{OHMS. } M^2/M}$

# DETAIL LOG
5″ = 100′

**SPONTANEOUS-POTENTIAL**
MILLIVOLTS

DEPTHS

**RESISTIVITY**
OHMS. $M^2/M$

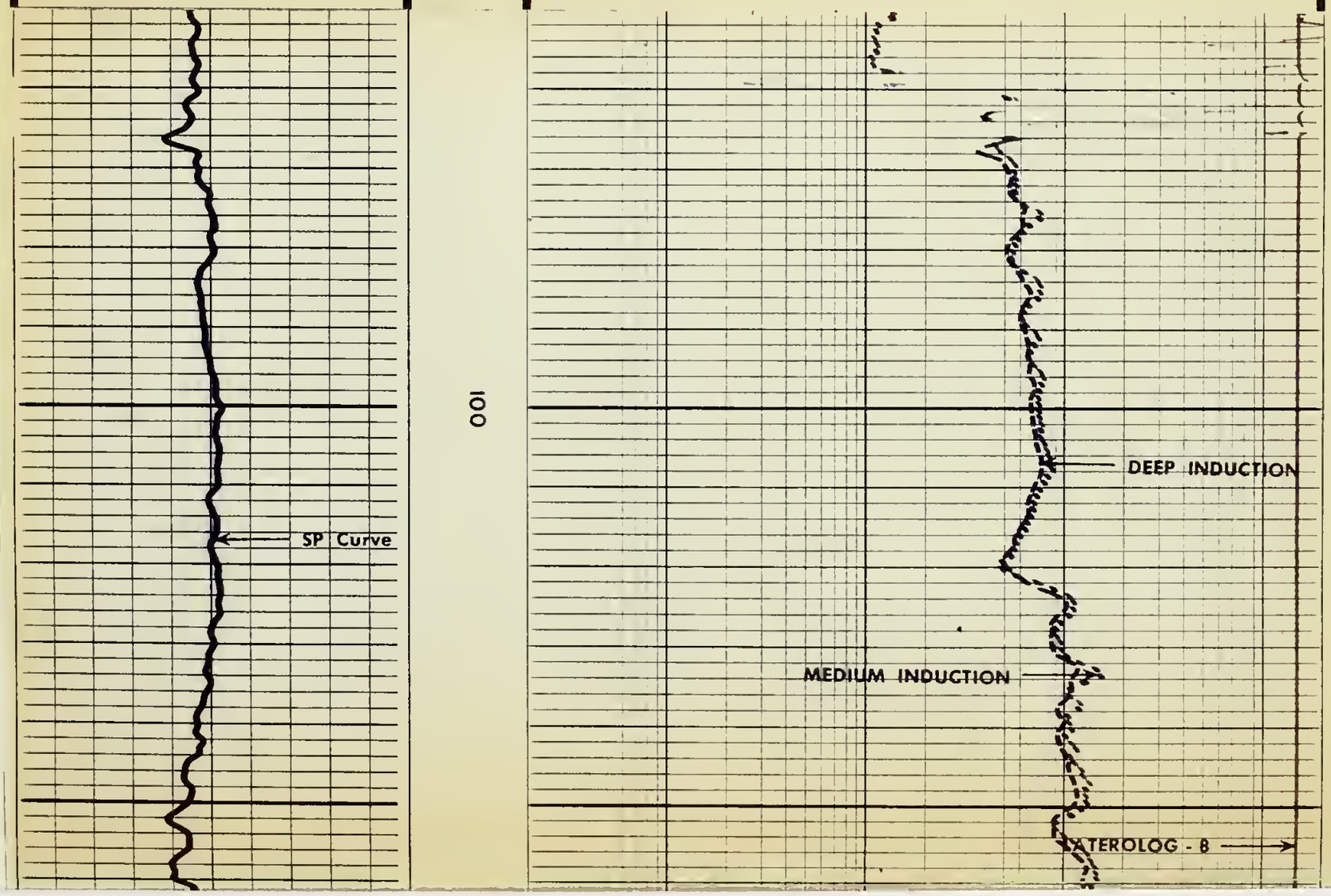
$-\left|\overset{20}{\underset{MV}{\leftrightarrow}}\right|+$

**DEEP INDUCTION LOG**
0.2 1.0 10 100 1000 2000

**MEDIUM INDUCTION LOG**
0.2 1.0 10 100 1000 2000

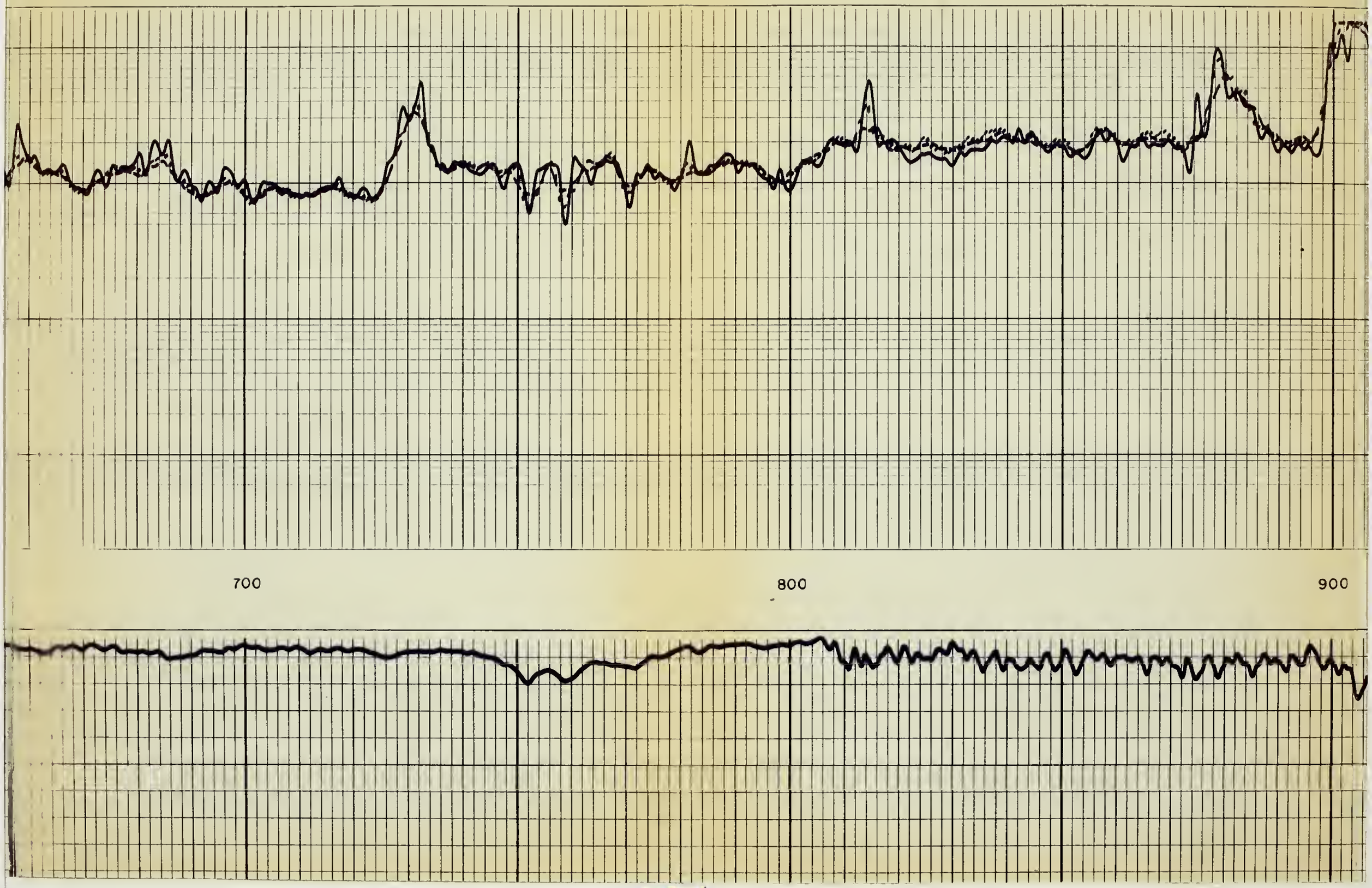
**LATEROLOG —8**
0.2 1.0 10 100 1000 2000

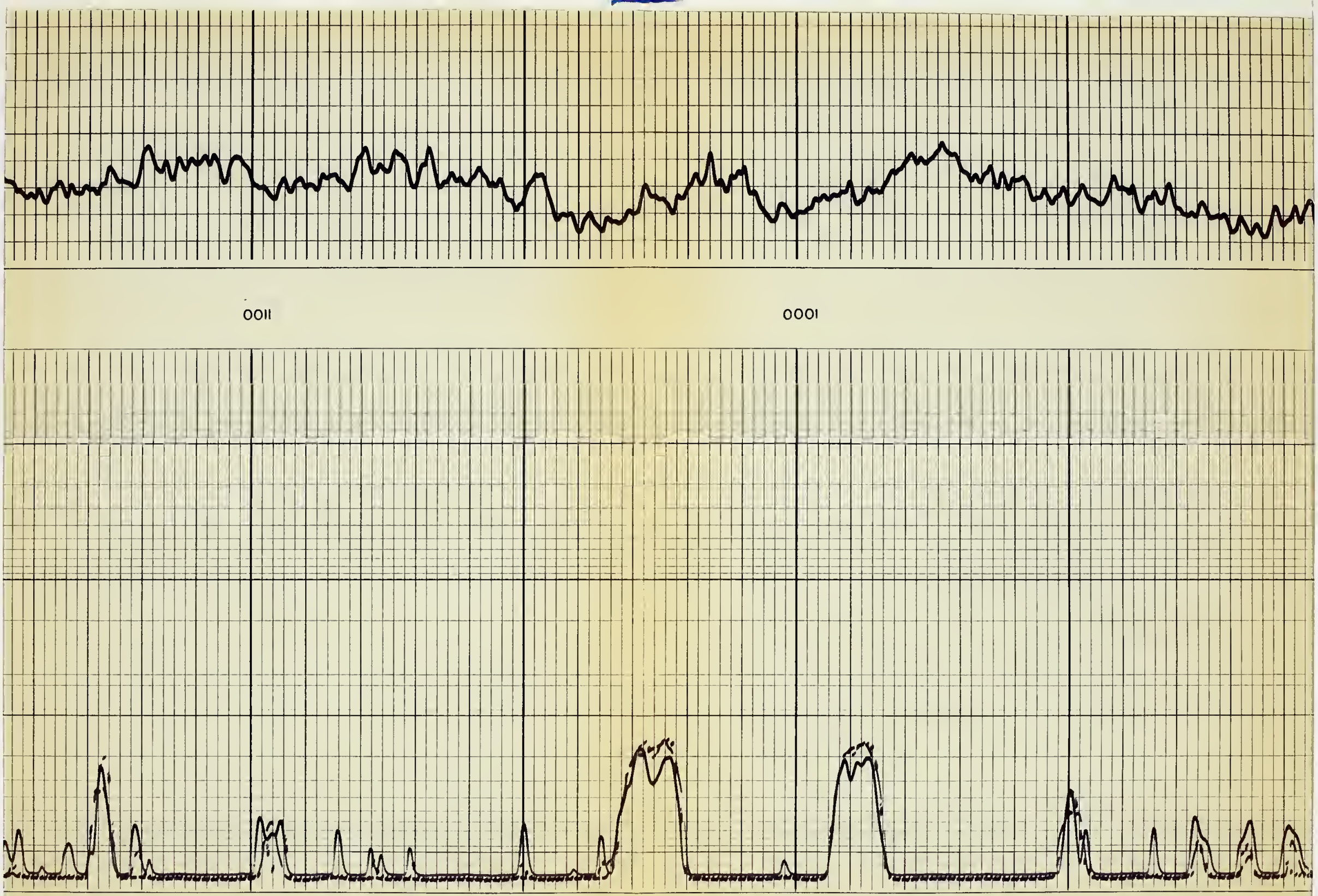
**GAMMA RAY**
API UNITS

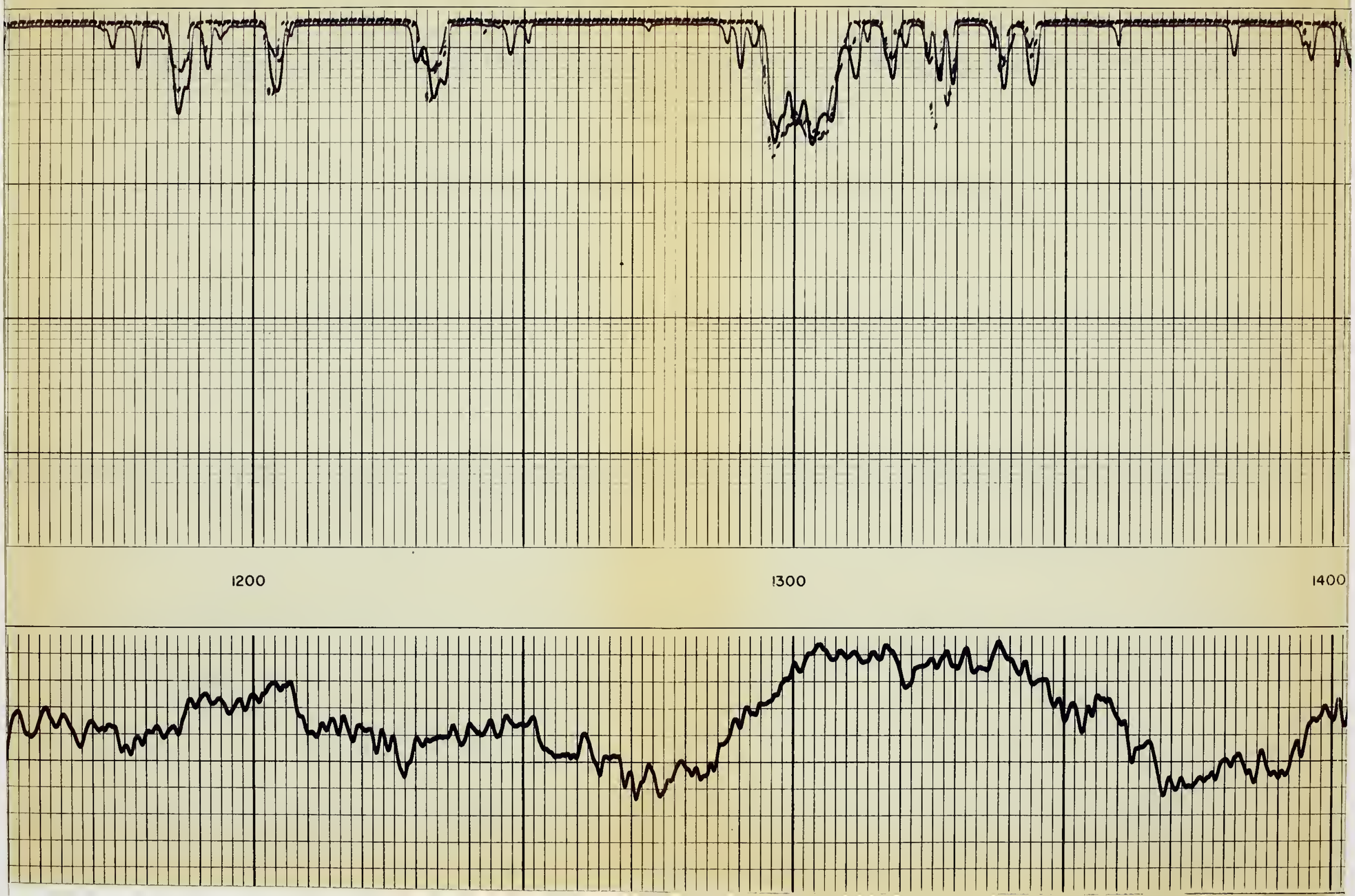


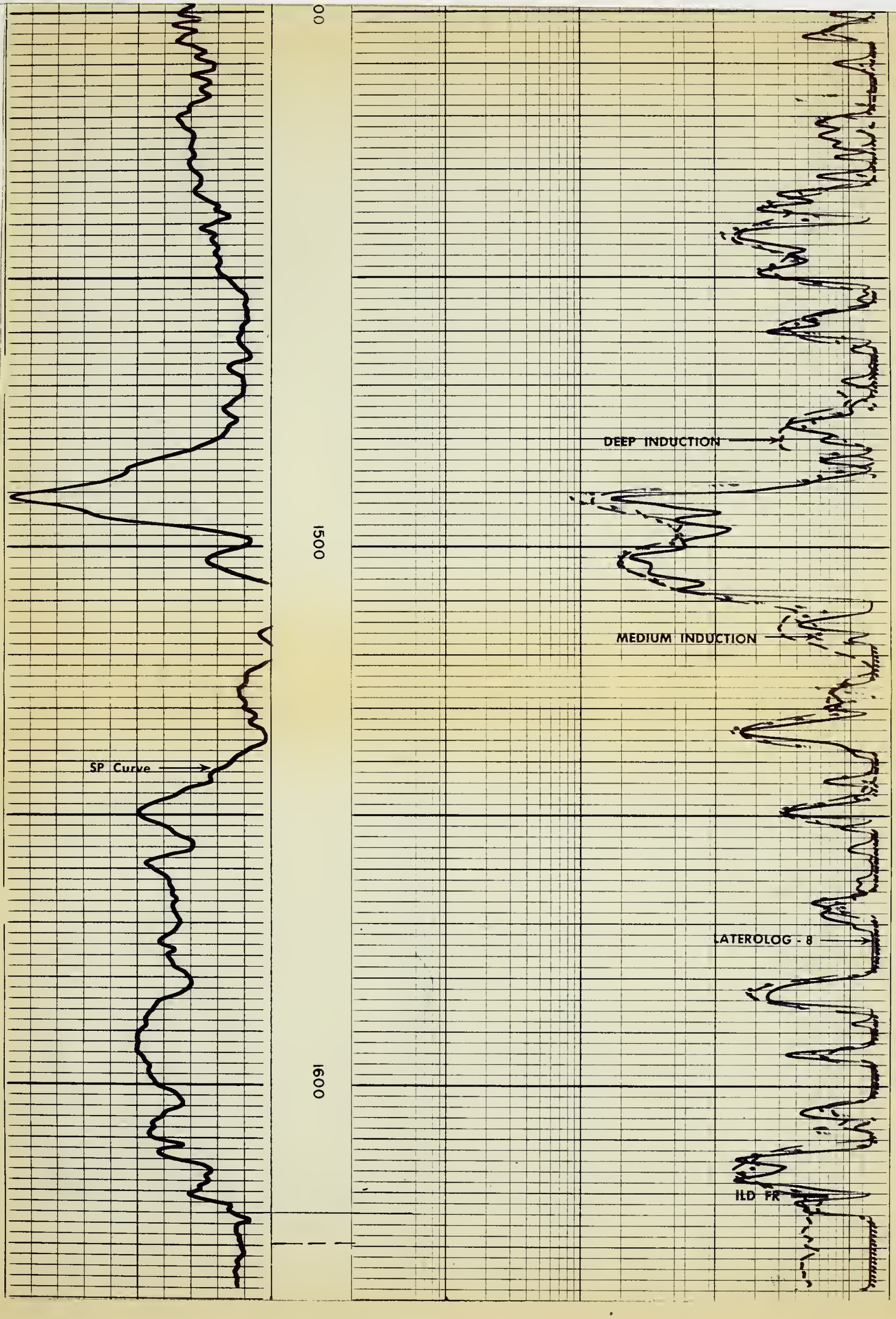
200
300
400

500
600


700
800
900


0011
0001


1200
1300
1400


1400
1500
1600
SP Curve
DEEP INDUCTION
MEDIUM INDUCTION
LATEROLOG - 8
ILD FR

REPEAT SECTION

MEMORIZER OUT — 1500 CURVES INVALID

1600

ILD FR

GAMMA RAY

API UNITS

LATEROLOG — 8

0.2 1.0 10 100 1000 2000

MEDIUM INDUCTION LOG

0.2 1.0 10 100 1000 2000

DEEP INDUCTION LOG

0.2 1.0 10 100 1000 2000

| SPONTANEOUS-POTENTIAL<br>MILLIVOLTS | DEPTHS | RESISTIVITY<br>OHMS. $M^2/M$ |
|---|---|---|

COMPANY ATLANTIC RICHFIELD

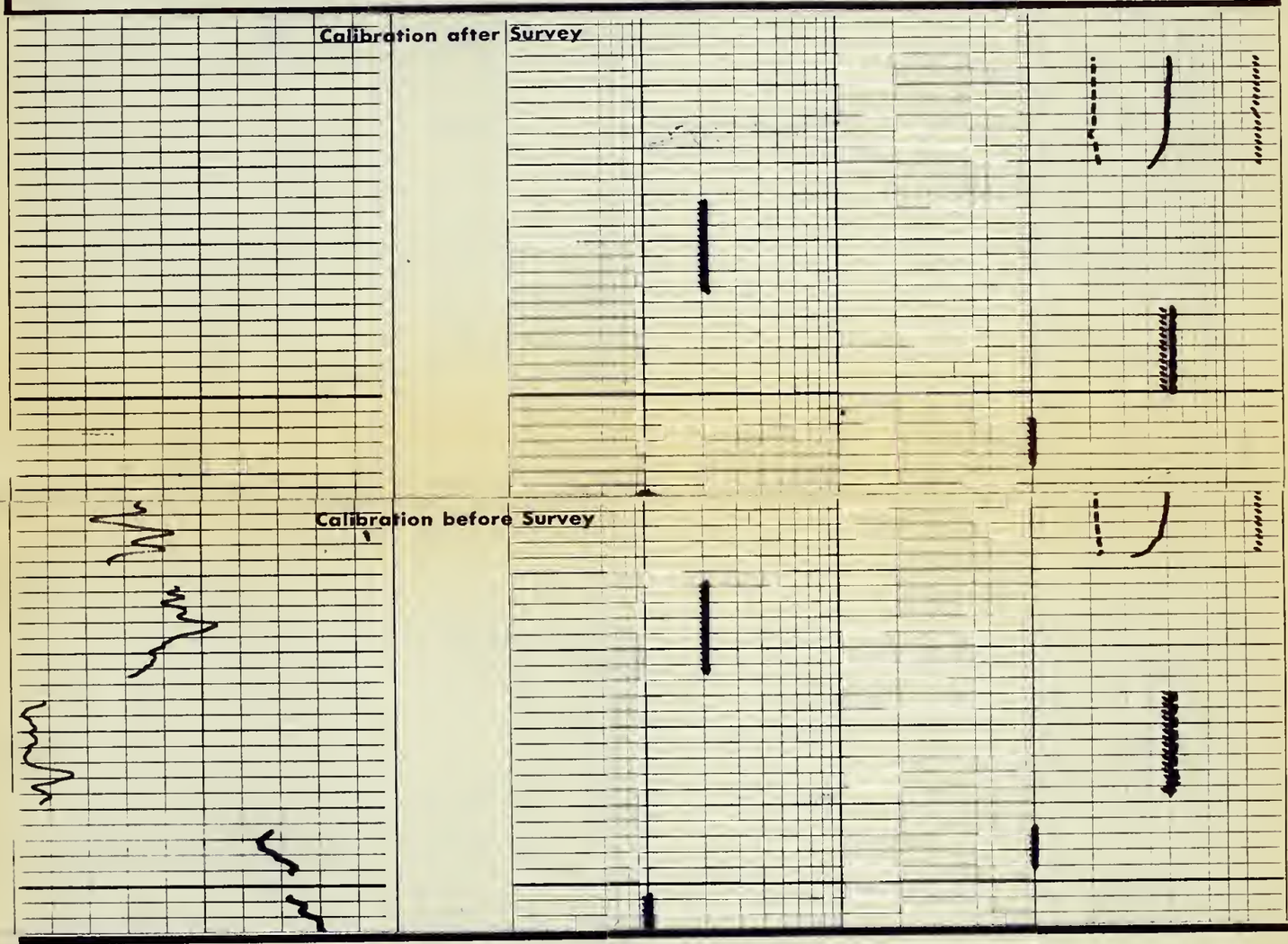
WELL SORGHUM GULCH 1-D

FIELD --

COUNTY RIO BLANCO STATE COLORADO

SCHL. FR 1624
SCHL. TD 1630
DRLR TD 1640
Elev:
KB 6903
DF 6903
GL 6903

## CALIBRATION RECORD




### DUAL INDUCTION CALIBRATION FILM CODING

1. MECHANICAL ZERO
2. 1 OHM-M
3. 100 OHM-M
4. ELECTRICAL ZERO (500 OHM-M)
5. 2 OHM-M
6. SONDE ERRORS (+2 MMHO)
7. ZERO SIGNAL IN AIR
8. ILd TEST LOOP (2 OHM SIGNAL)
9. ILm TEST LOOP (2 OHM SIGNAL)
10. Rxo/Rt UNITY
11. Rxo/Rt CALIBRATE


## CALIBRATION RECORD

COMPANY ATLANTIC RICHFIELD

WELL SORGHUM GULCH 1-D

FIELD --

COUNTY RIO BLANCO STATE COLORADO

SCHL. FR 1624
SCHL. TD 1630
DRLR TD 1640
Elev:
KB 6903
DF 6903
GL 6903


SWS-1918-B

SIMULTANEOUS

# COMPENSATED NEUTRON-FORMATION DENSITY

Schlumberger

COMPANY ATLANTIC RICHFIELD ET AL

WELL SORGHUM GULCH 1-D

FIELD --

COUNTY RIO BLANCO STATE COLORADO

COUNTY RIO BLANCO
FIELD or LOCATION
WELL SORGHUM GULCH 1-D
COMPANY ATLANTIC RICHFIELD

Location: API Serial No. 7108
1515 W LINE 1511 S LINE
Sec. 7 Twp. 3S Rge. 96W

Other Services:
DIL, BHC, GR, TEMP.

Permanent Datum: GL ; Elev.: 6903
Log Measured From GL , Ft. Above Perm. Datum
Drilling Measured From GL

Elev.: K.B. 6903
D.F. 6903
G.L. 6903

| | | | | |
|---|---|---|---|---|
| Date | 7/28/74 | | | |
| Run No. | ONE | | | |
| Depth—Driller | 1640 | | | |
| Depth—Logger | 1632 | | | |
| Btm. Log Interval | 1631 | | | |
| Top Log Interval | 60 | | | |
| Casing—Driller | 8 5/8 @ 60 | @ | @ | @ |
| Casing—Logger | 60 | | | |
| Bit Size | 7 7/8 | | | |
| Type Fluid in Hole | AIR MIST | | | |
| Fluid Level | | | | |
| Dens. / Visc. | | | | |
| pH / Fluid Los | ml | ml | ml | ml |
| Source of Sample | | | | |
| $R_{mm}$ @ Meas. Temp. | @ °F | @ °F | @ °F | @ °F |
| $R_{mf}$ @ Meas. Temp. | @ °F | @ °F | @ °F | @ °F |
| $R_{mc}$ @ Meas. Temp. | @ °F | @ °F | @ °F | @ °F |
| Source: $R_{mf}$ / $R_{mc}$ | | | | |
| $R_m$ @ BHT | @ 90 °F | @ °F | @ °F | @ °F |
| Time Since Circ. | 8 HOURS | | | |
| Max. Rec. Temp. | 90 °F | °F | °F | °F |
| Equip. / Location | 7674 / VERN | | | |
| Recorded By | STRAWN | | | |
| Witnessed By | MR TAIT | | | |

FOLD HERE

The well name, location and borehole reference data were furnished by the customer.

CHANGES IN MUD TYPE OR ADDITIONAL SAMPLES

| | Depth | Scale Up Hole | Scale Down Hole |
|---|---|---|---|
| Date / Sample No. | | | |
| Depth - Driller | | | |
| Type Fluid | | | |
| Source of Sample | | | |
| Rm @ Meas. Temp. | @ °F | @ °F | @ °F |
| Rmf @ Meas. Temp. | @ °F | @ °F | @ °F |
| Rmc @ Meas. Temp. | @ °F | | |
| Rm @ BHT | @ °F | | |
| Dens. / Visc. | | | |
| ph / Fluid Loss | ml | ml | ml |
| % Water by Vol. | | | |
| % Oil by Vol. | | | |
| % Solids by Vol. | | | |
| Solids Av. Sp. Gr. | | | |

SCALE CHANGES

| Type Log | Depth | Scale Up Hole | Scale Down Hole |
|---|---|---|---|
| | | | |

LOGGING DATA

CNP

| Auto Hole Size Corr. | Hole Size Setting (if not auto) | Porosity Scale | From | To |
|---|---|---|---|---|
| ☒ Yes ☐ No | | 45% | 1640 | 60 |
| ☐ Yes ☐ No | | | | |
| ☐ Yes ☐ No | | | | |
| ☐ Yes ☐ No | | | | |
| ☐ Yes ☐ No | | | | |

FDC

| Groin Density | Hole Fluid | Porosity Scale | From | To |
|---|---|---|---|---|
| 2.71 | LIQ | 45% | 1640 | 60 |

| Matrix | Liquid Density |
|---|---|
| LIME | 1.00 |

REMARKS

Service Order No. - 7108

EQUIPMENT DATA

| Run No. | ONE |
|---|---|
| Dens. Pnl. | 355 |
| Dens. Cart | 383 |
| Dens. Skid | 549 |
| Dens. Sde | 235 |
| Dens. Source | 2940 |
| Dens. Colib. | 545 |
| Neut. Pnl. | 27 |
| Neut. Cart | 26 |
| Neut. Source | 185 |
| Neut. Calib | 126 |
| GR Cart | 98 |
| TTR | -- |
| Mem Pnl. | 173 |

BIT SIZE/CASING DATA

| Bit | From | To | Csg. Size | Csg. Wt. | From | To |
|---|---|---|---|---|---|---|
| 7 7/8 | 0 | 60 | 8 5/8 | 24 | 0 | 60 |

SWS-1872-E

| | | | | | | |
|---|---|---|---|---|---|---|
| 7 7/8 | 60 | 1640 | 8 5/8 | | SUR | 60 |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |

## CALIBRATION DATA

| Run No. | Gamma Ray | | | CNL—Before Log—ACPS | | CNL—After Log—ACPS | |
|---|---|---|---|---|---|---|---|
| | API Scale | Background CPS | Total CPS | Long Spacing | Short Spacing | Long Spacing | Short Spacing |
| 1 | | | | 432 | 948 | 432 | 948 |
| 2 | 0-150 | 60 | 160 | | | | |
| 3 | | | | | | | |
| 4 | | | | | | | |
| | | | | FDC — Before Log — ACPS | | FDC — After Log — ACPS | |
| 1 | | | | $P_1$ | $P_2$ | $P_1$ | $P_2$ |
| 2 | | | | 440 | 720 | 440 | 720 |
| 3 | | | | | | | |
| 4 | | | | | | | |

All interpretations are opinions based on inferences from electrical or other measurements and we cannot, ond do not guorantee the occuracy or correctness of any interpretations, and we shall not, except in the case of gross or willful negligence on our part, be liable or responsible for any loss, costs, damages or expenses incurred or sustained by anyone resulting from any interpretation made by any of our officers, ogents or employees. These interpretations ore also subject to Clause 7 of our General Terms and Conditions as set out in our current Price Schedule.

# DETAIL LOG

5" = 100'

**CALIPER**
HOLE DIAM. IN INCHES

6" 16"

DEPTHS

**DENSITY POROSITY INDEX %**
LIME MATRIX

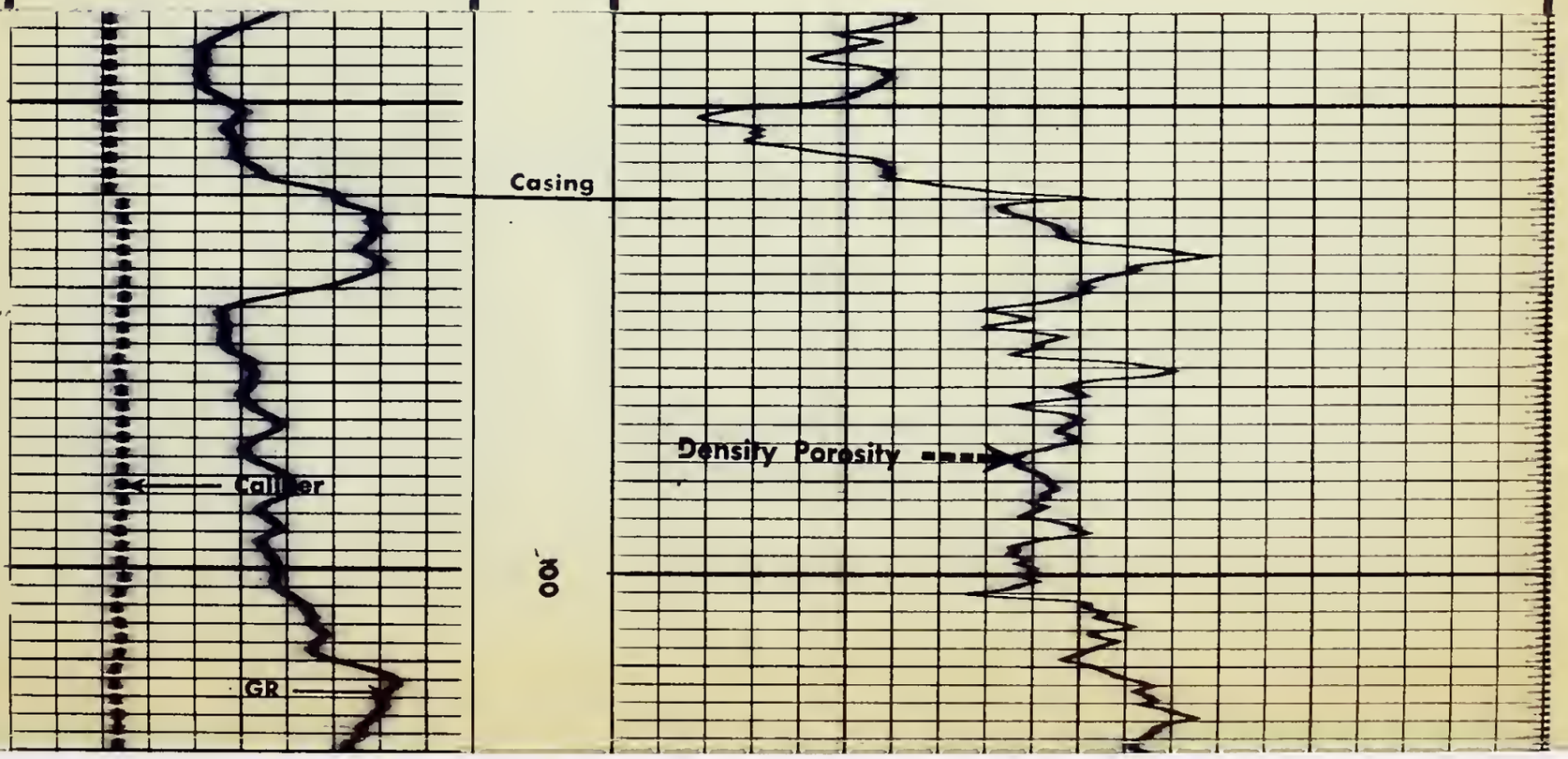
60 30 0

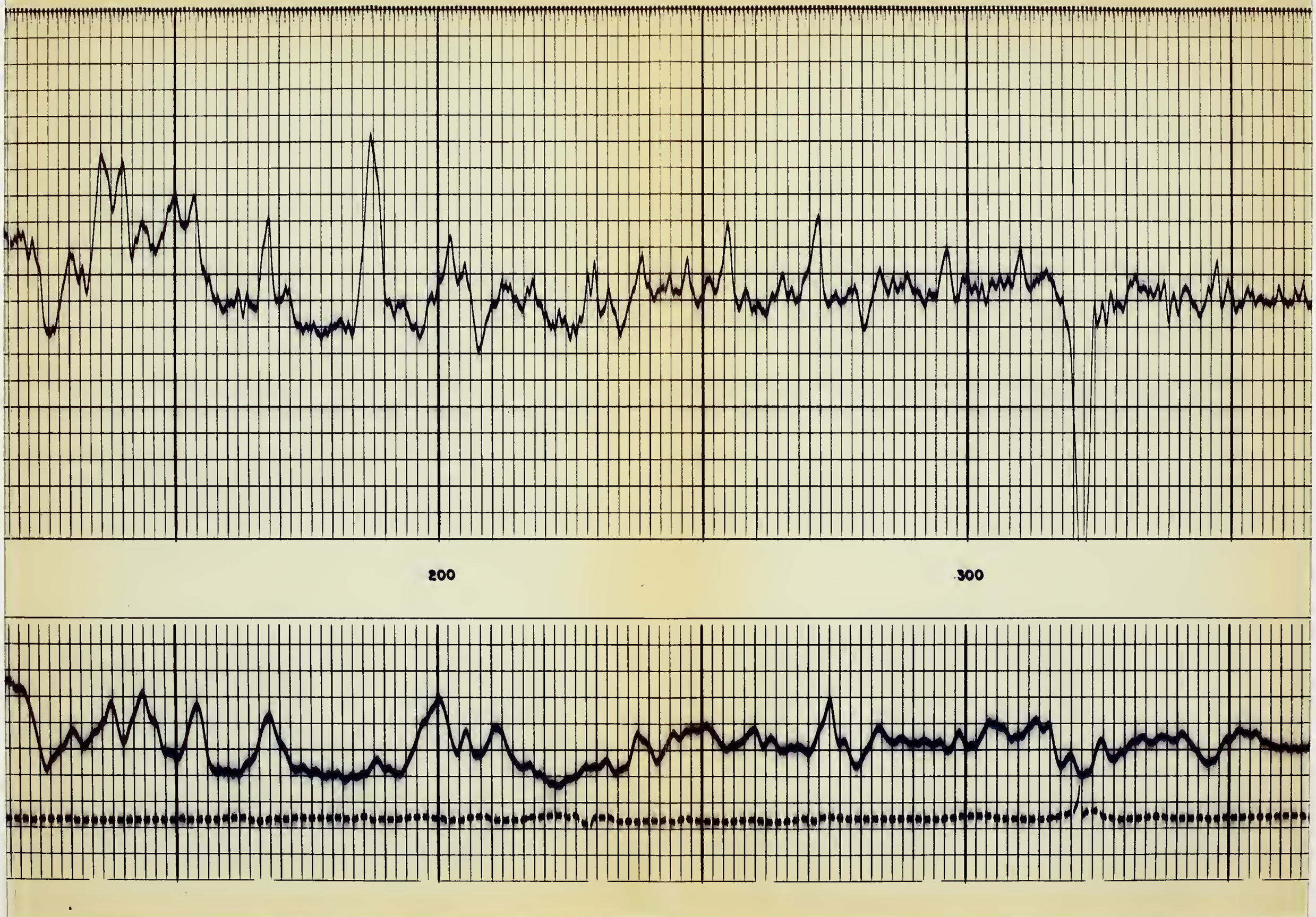
**GAMMA RAY**
API UNITS

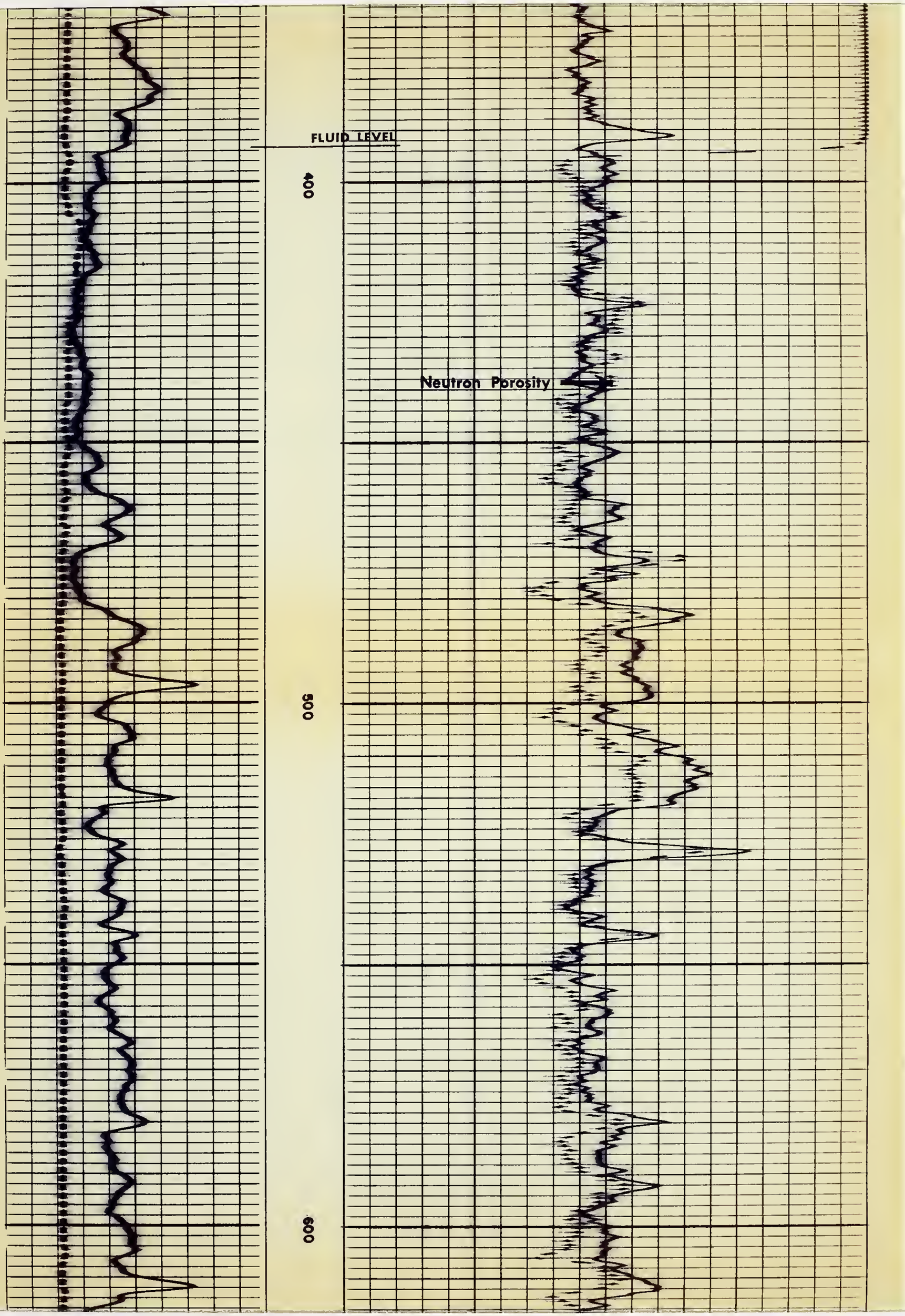
0 150

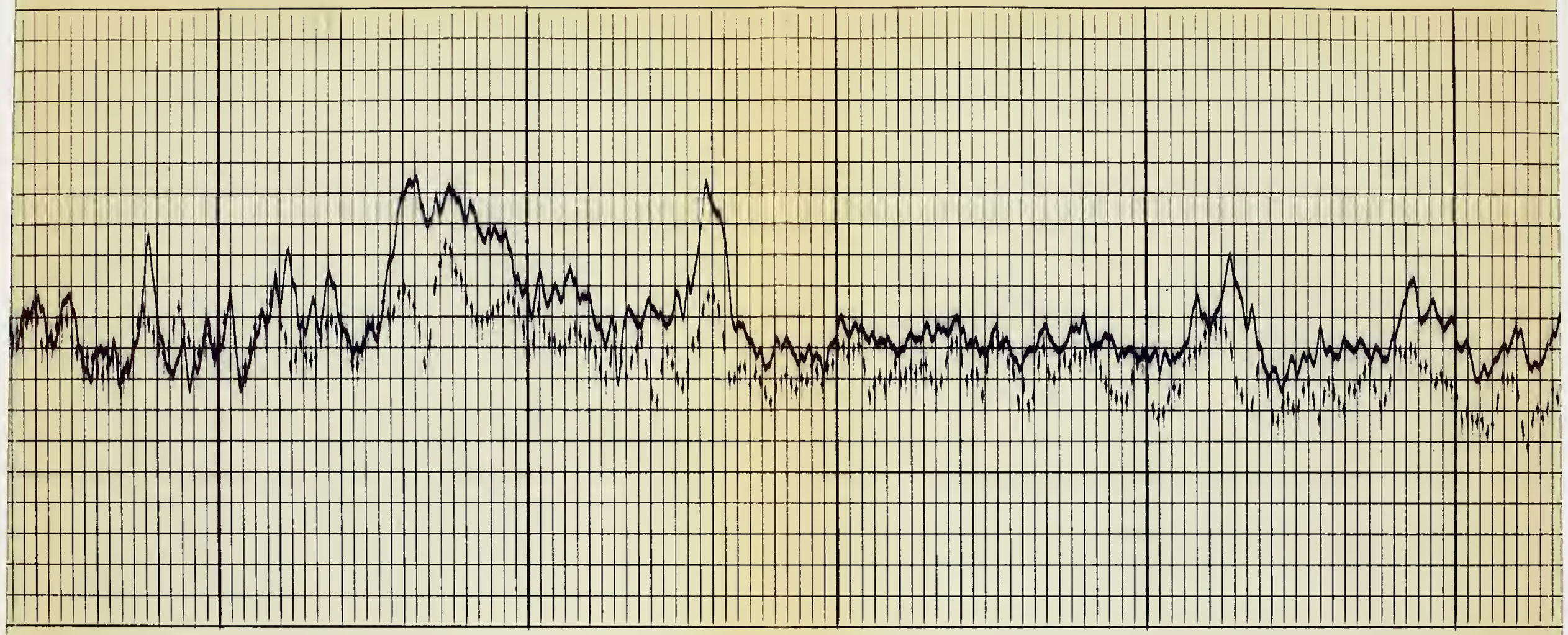
**NEUTRON POROSITY INDEX %**
LIME MATRIX

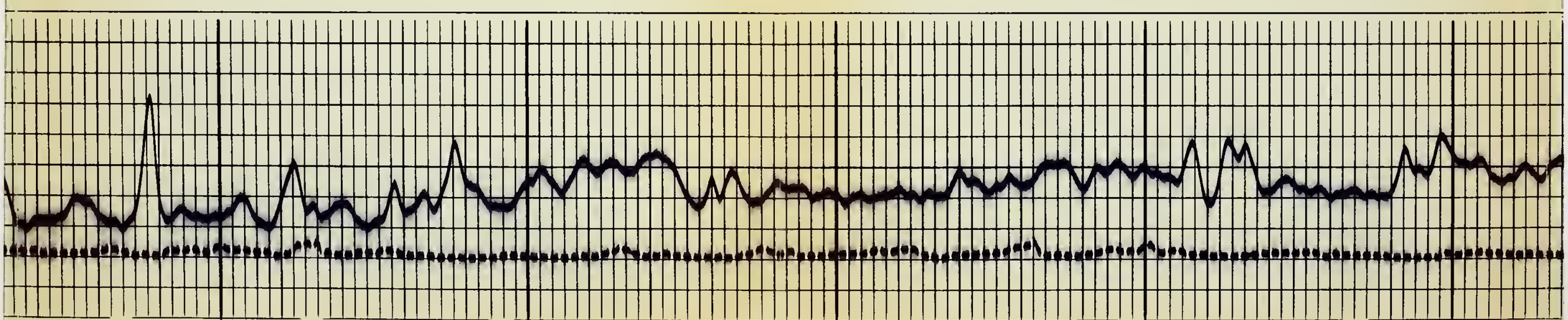
60 30 0

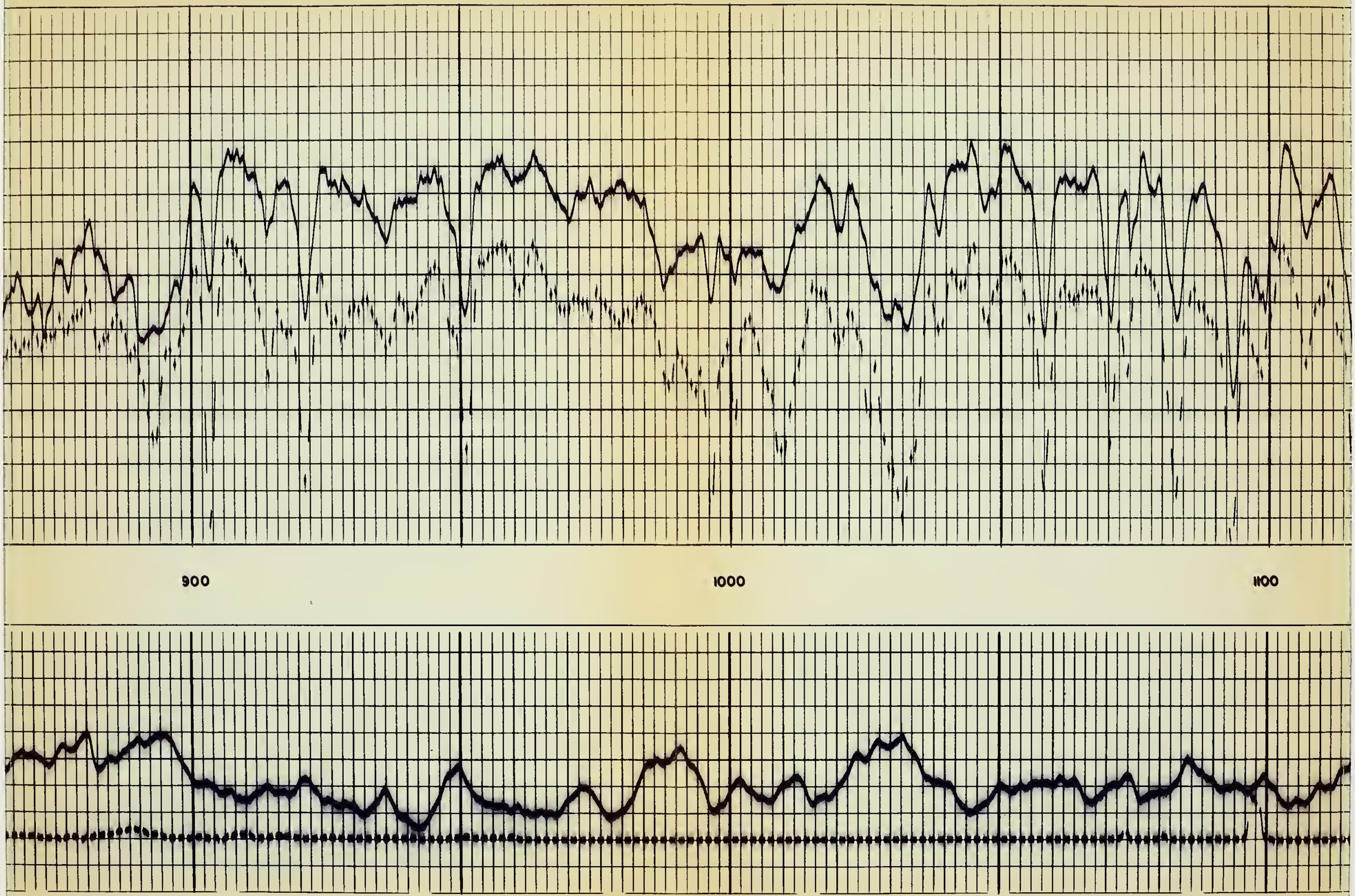



200
300


FLUID LEVEL
400
Neutron Porosity
500
600

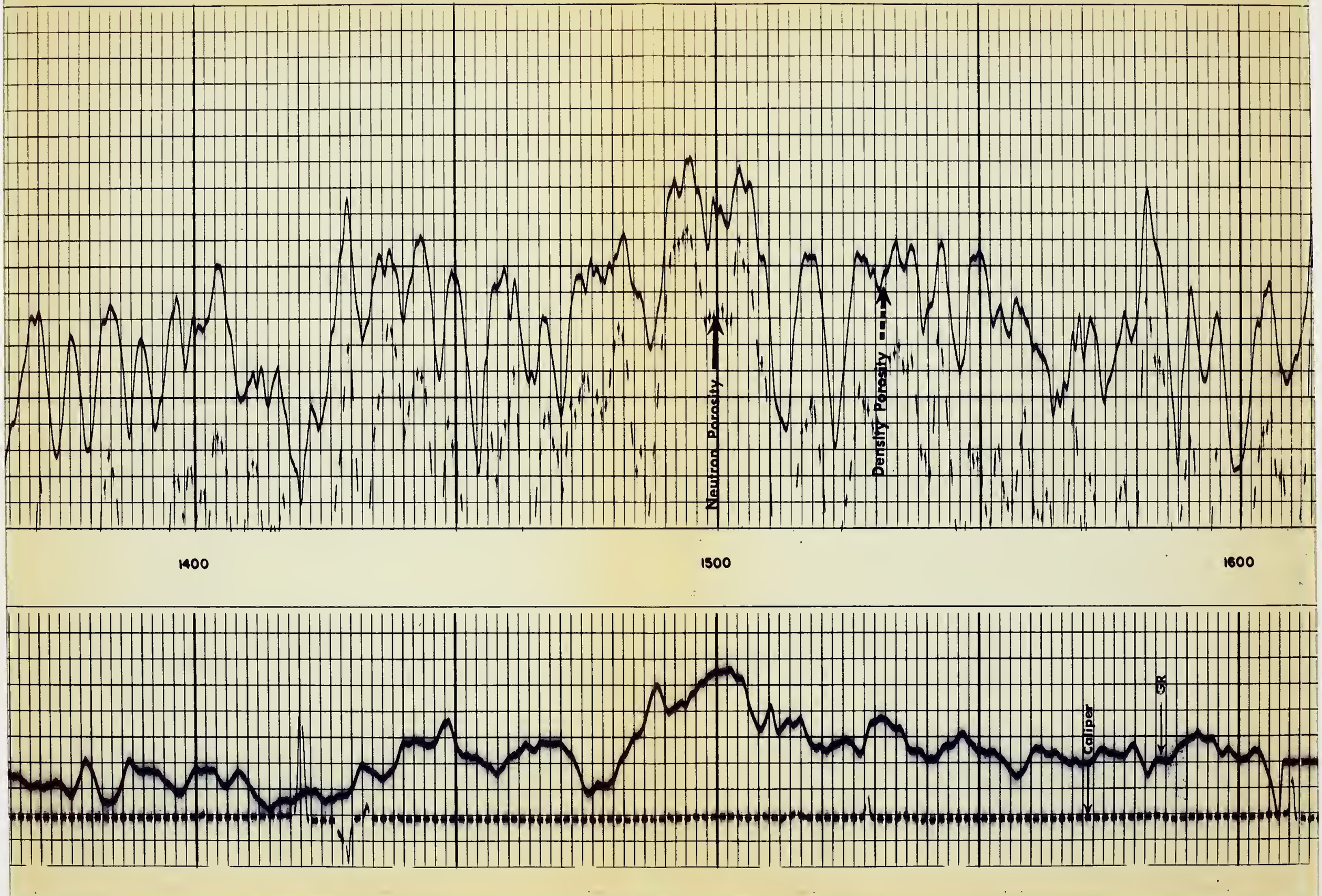

700
800

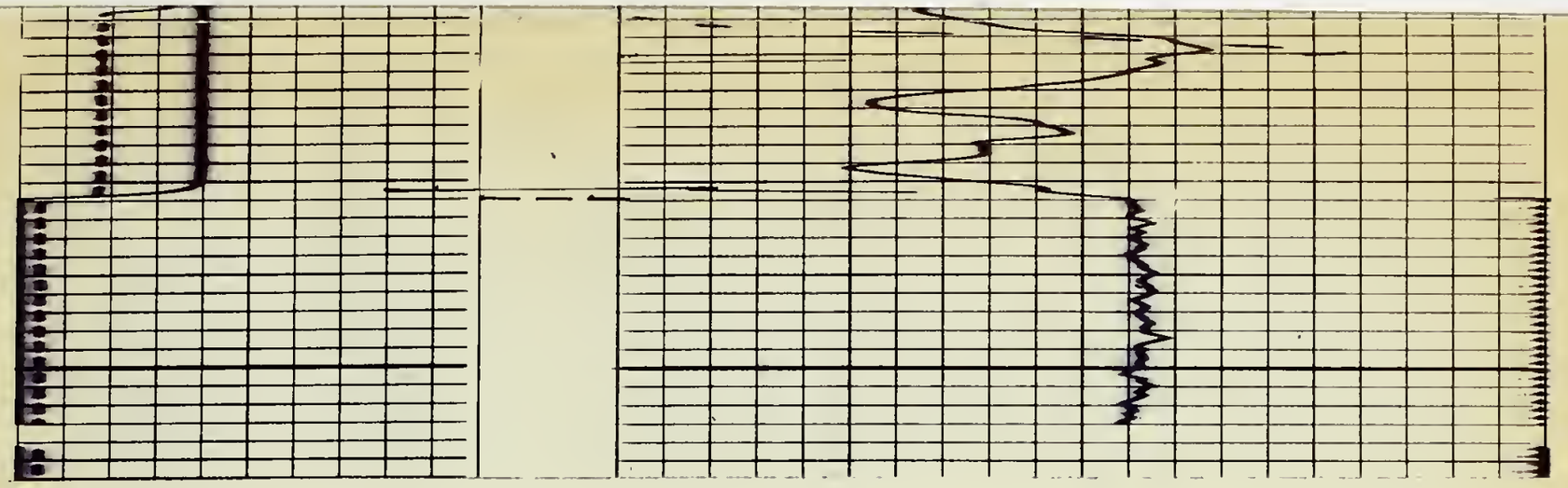


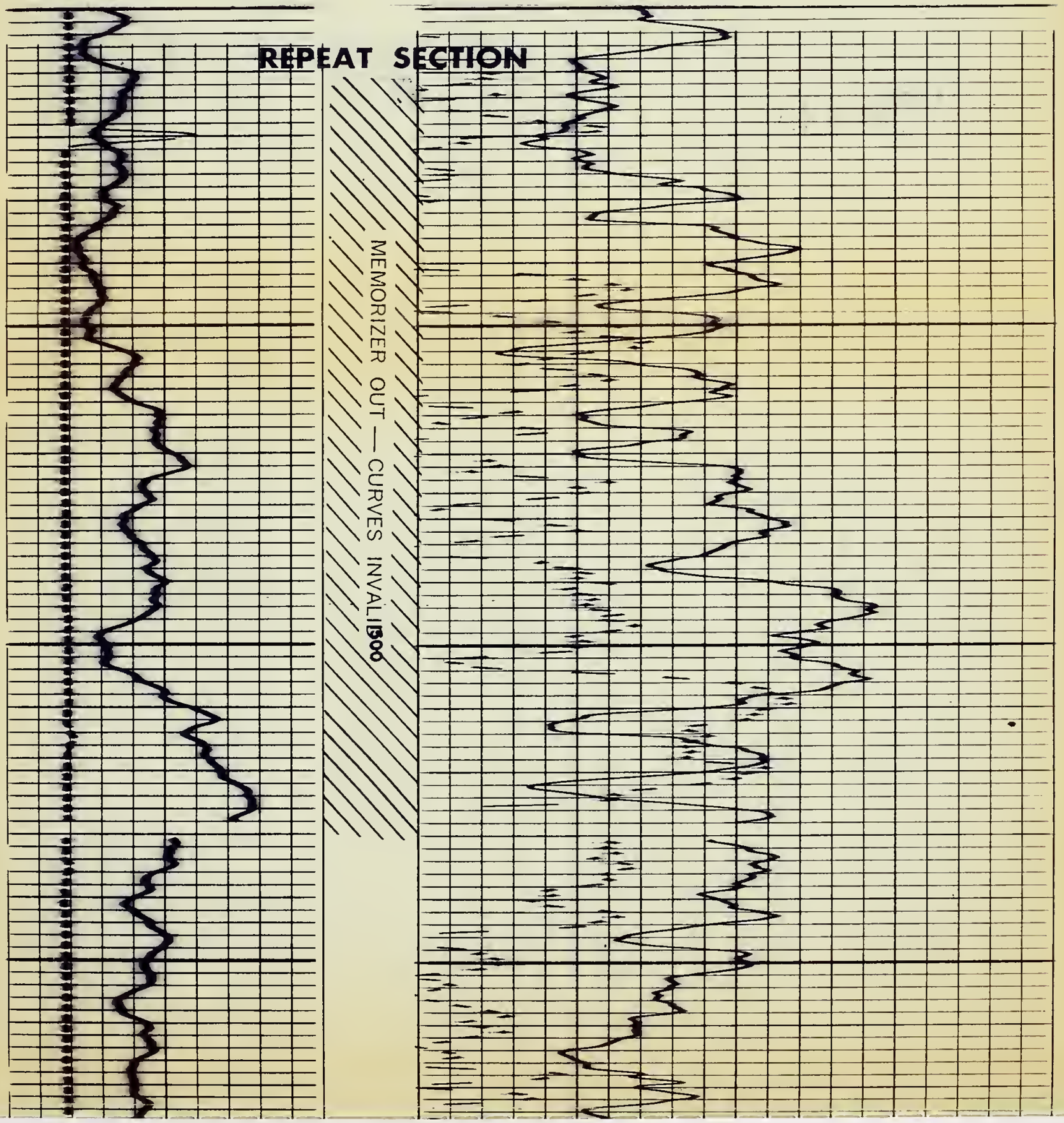

900
1000
1100

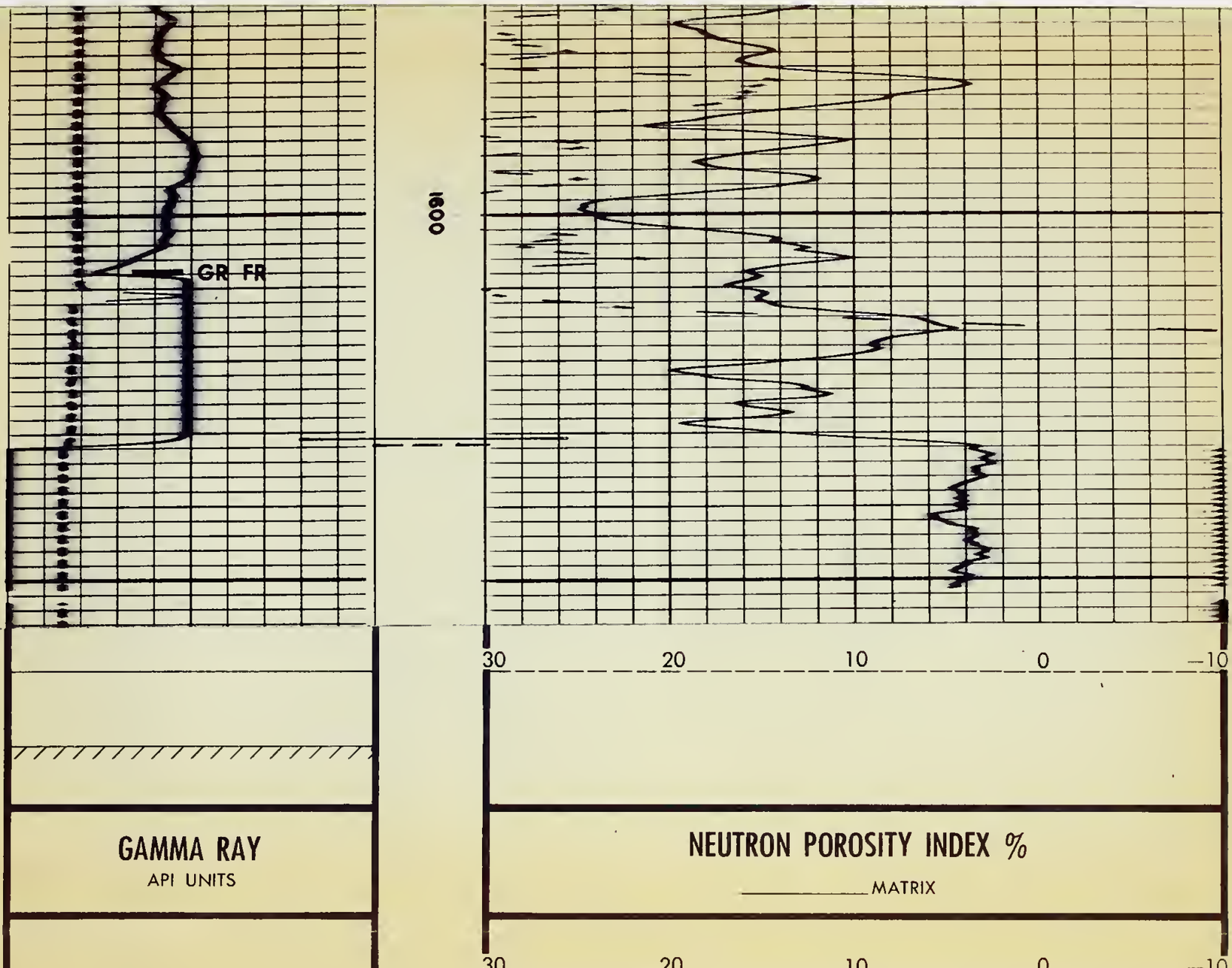
1200

1300


Neutron Porosity
Density Porosity
1400
1500
1600
Caliper
GR




REPEAT SECTION
MEMORIZER OUT — CURVES INVALID




30 20 10 0 —10

## GAMMA RAY
API UNITS

## NEUTRON POROSITY INDEX %
_____ MATRIX

30 20 10 0 —10

## CALIPER
HOLE DIAM. IN INCHES

DEPTHS

## DENSITY POROSITY INDEX %
_____ MATRIX

COMPANY ATLANTIC RICHFIELD

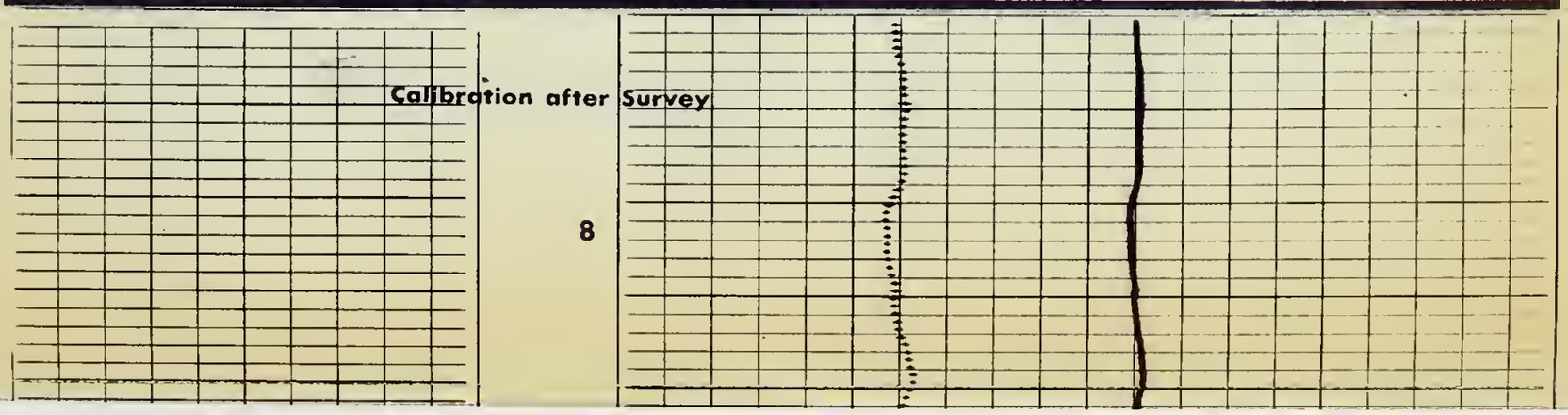
WELL SORGHUM GULCH 1-D

FIELD --

COUNTY RIO BLANCO STATE COLORADO

SCHL. FR 1631
SCHL. TD 1632
DRLR TD 1640
Elev:
KB 6903
DF 6903
GL 6903

## CALIBRATION RECORD



7

2

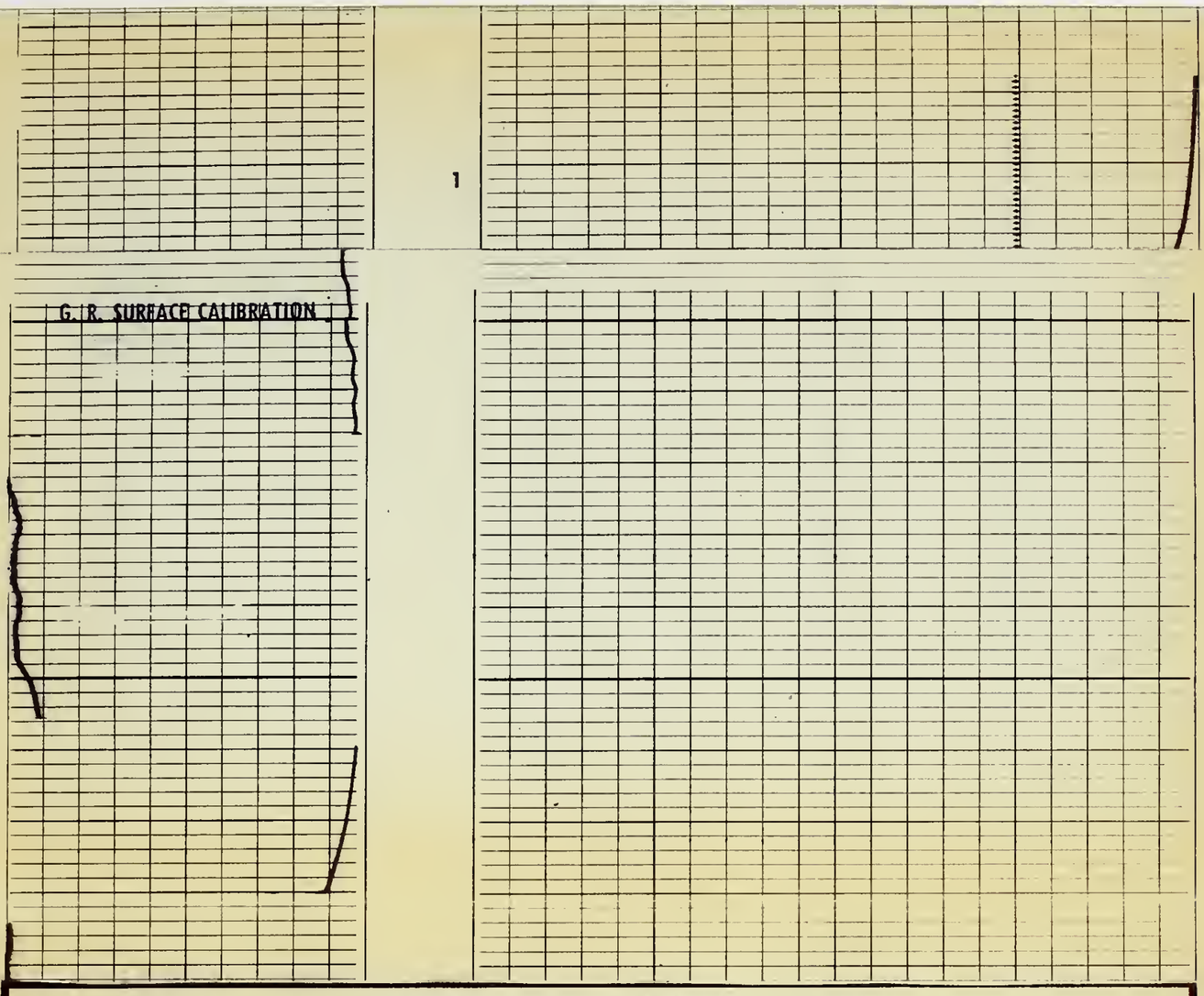
1

Calibration before Survey

8

7

2




## COMPENSATED NEUTRON CALIBRATION CODING

1. MECHANICAL ZERO
2. RECORDED SENSITIVITY (THRU MEMORIZER IF USED)

PANEL TEST

| | RATIO | OH POROSITY | | | CH POROSITY | |
|---|---|---|---|---|---|---|
| | | LS ☒ | SS ☐ | DOL ☐ | SS ☐ | LS ☐ |
| 3. | 1 | 1.6 | 4.9 | −0.2 | 2.4 | 0.1 |
| 4. | 2 | 15.6 | 19.7 | 8.1 | 13.0 | 9.0 |
| 5. | 3 | 31.3 | 36.0 | 25.2 | 29.1 | 24.1 |
| 6. | 4 | 52.2 | 61.4 | 53.0 | 52.2 | 45.2 |

7. POROSITY NORMALIZED WITH CNB-A IN PLACE
   7A. TOOL IN NCT-B
8. LOG POSITION WITH CNB-A IN PLACE
   8A. LOG POSITION WITH TOOL IN NCT-B

| OH | | | CH | |
|---|---|---|---|---|
| LS | SS | DOL | SS | LS |
| 18 | 22.2 | 10.4 | 15.3 | 11.2 |

RATIO (NORMALIZED) $= \frac{2.17}{\text{RATIO (NCT-B)}}$ RATIO LOG

## FORMATION DENSITY COMPENSATED CALIBRATION CODING

1. MECHANICAL ZERO
2. RECORDER SENSITIVITY

PANEL TEST

FDC LIQUID

| | POS | $\rho$ | $\Delta\rho$ |
|---|---|---|---|
| 3. | # 1 | 2.92 | .00 |
| 4. | # 2 | 2.78 | +.14 |
| 5. | # 3 | 2.42 | −.10 |
| 6. | # 4 | 2.35 | .00 |
| 7. | # 5 | 2.08 | .01 |

8. MECHANICAL ZERO CALIPER
9. 8" RING
10. 12" RING
11. TOOL CALIBRATE #1 SET $\rho = 2.50$
12. TOOL CALIBRATE #2 SET $\Delta\rho = .00$
13. LOG POSITION $\rho = 2.59$, $\Delta\rho = .015$

## CALIBRATION RECORD

COMPANY ATLANTIC RICHFIELD

WELL SORGHUM GULCH 1-D

FIELD --

COUNTY RIO BLANCO STATE COLORADO

SCHL. FR 1631
SCHL. TD 1632
DRLR TD 1640
Elev:
KB 6903
DF 6903
GL 6903

# ENGINEERED PRODUCTION LOGGING

Schlumberger

COMPANY ATLANTIC RICHFIELD

WELL SORGHUM GULCH AQUIFER TEST 1-D

FIELD

COUNTY RIO BLANCO STATE COLORADO

LOCATION: API Serial No.

1515' W LINE 1511 S LINE

Sec. 7 Twp. 3S Rge. 96W

SERVICES RUN:
DIL, BHC, FDC, CNL, GR

Permanent Datum: GL

Elev.: 6903

Log Measured From: GL

Drilling Measured From: GL

ELEVATION:

KB

DF

GL 6903

Equipment Location: VERNAL 7674

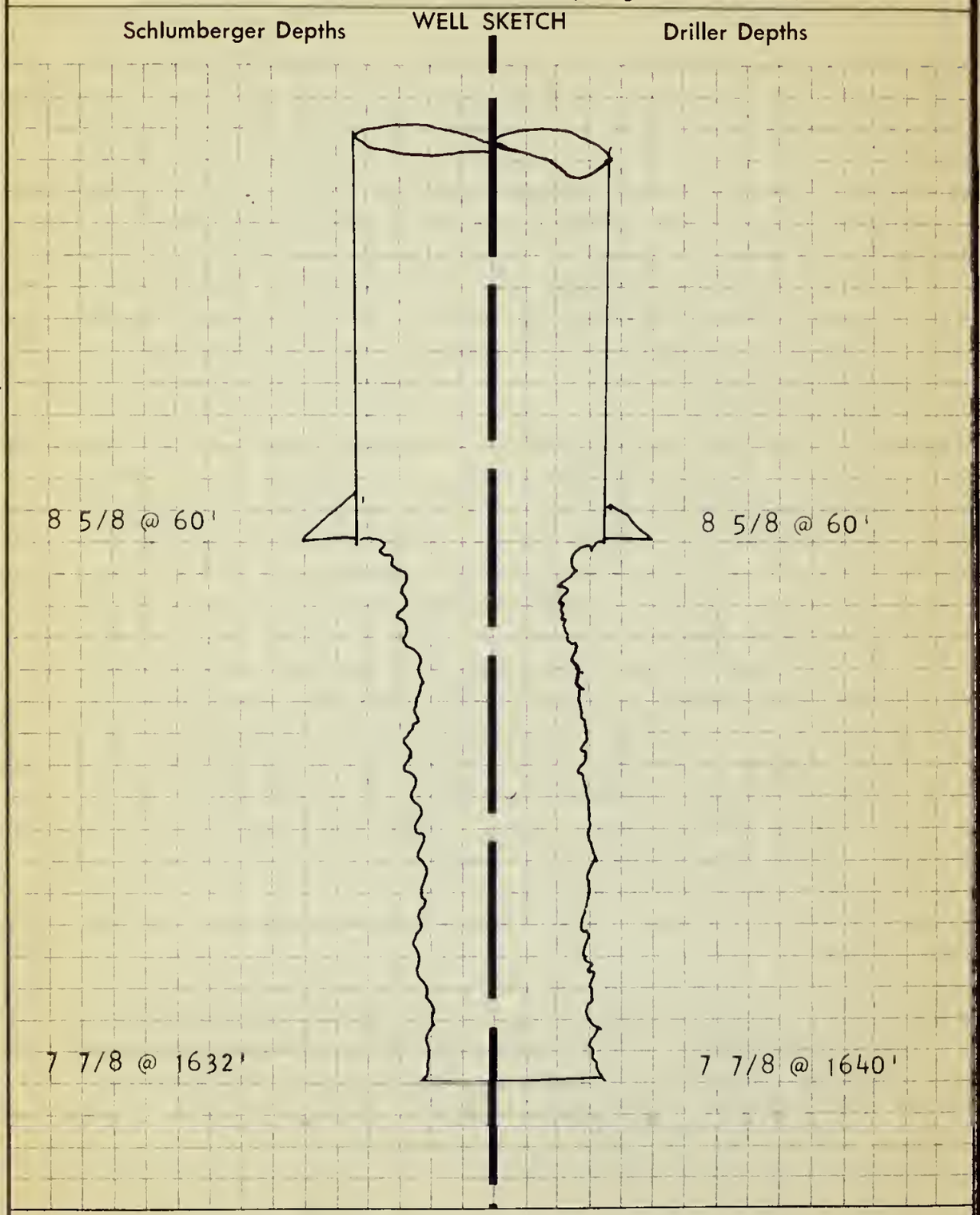
Recorded by: STRAWN

Witnessed by: MR. TAIT

The well name, location and borehole reference data were furnished by the customer.

FOLD HERE

Log depths of these records relate to: ☒ Schlumberger line measurements,
☐ correlated by CCL to Radioactivity Log Measurements.




Indicate: Hole deviation in production zone
Open hole diameter
Diameter and weight of casing and tubing
Position & nature of perforations (bullets, conventional SC, capsules, etc.)

SWS-1434-D

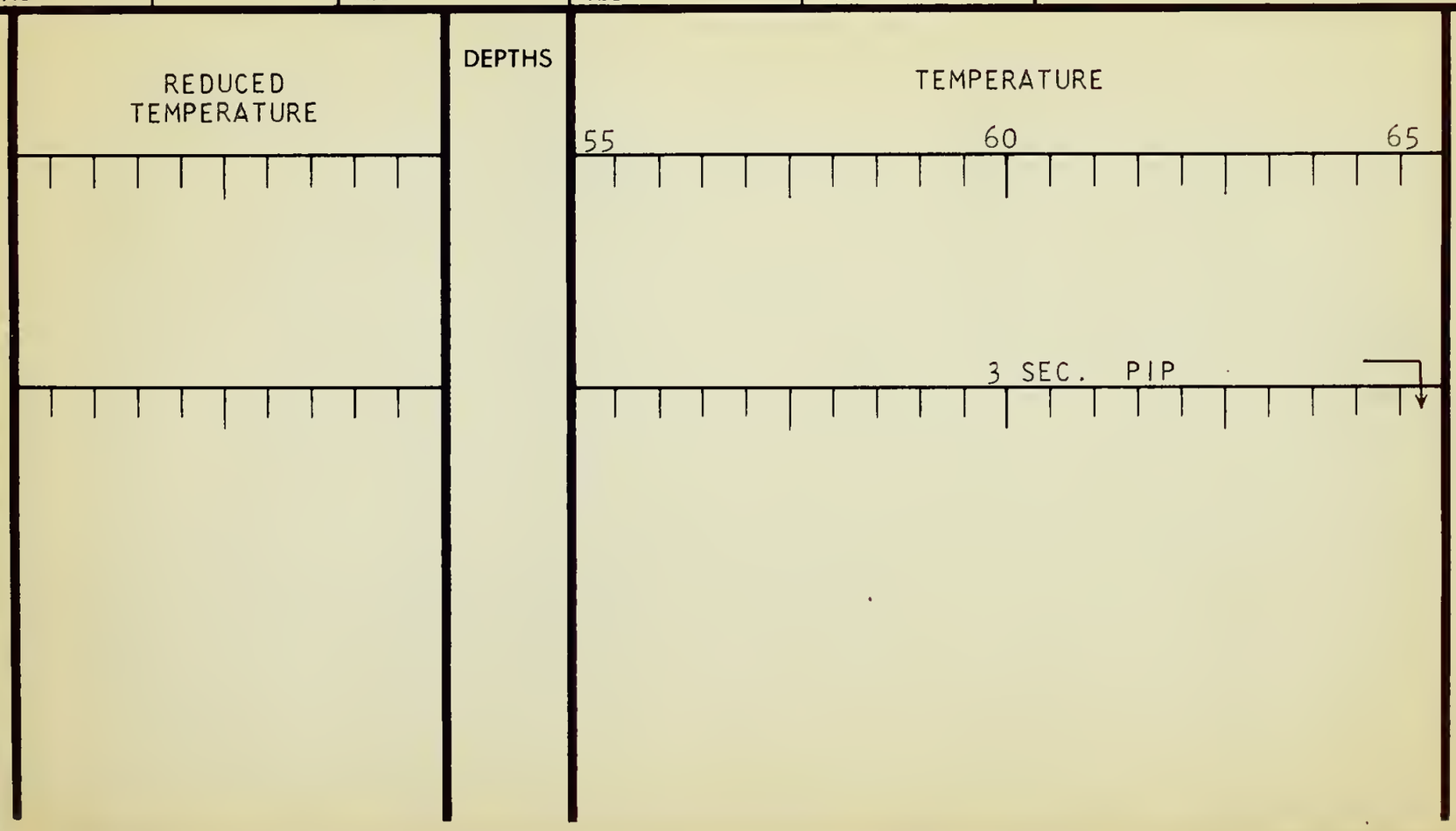
SWS-1427-D

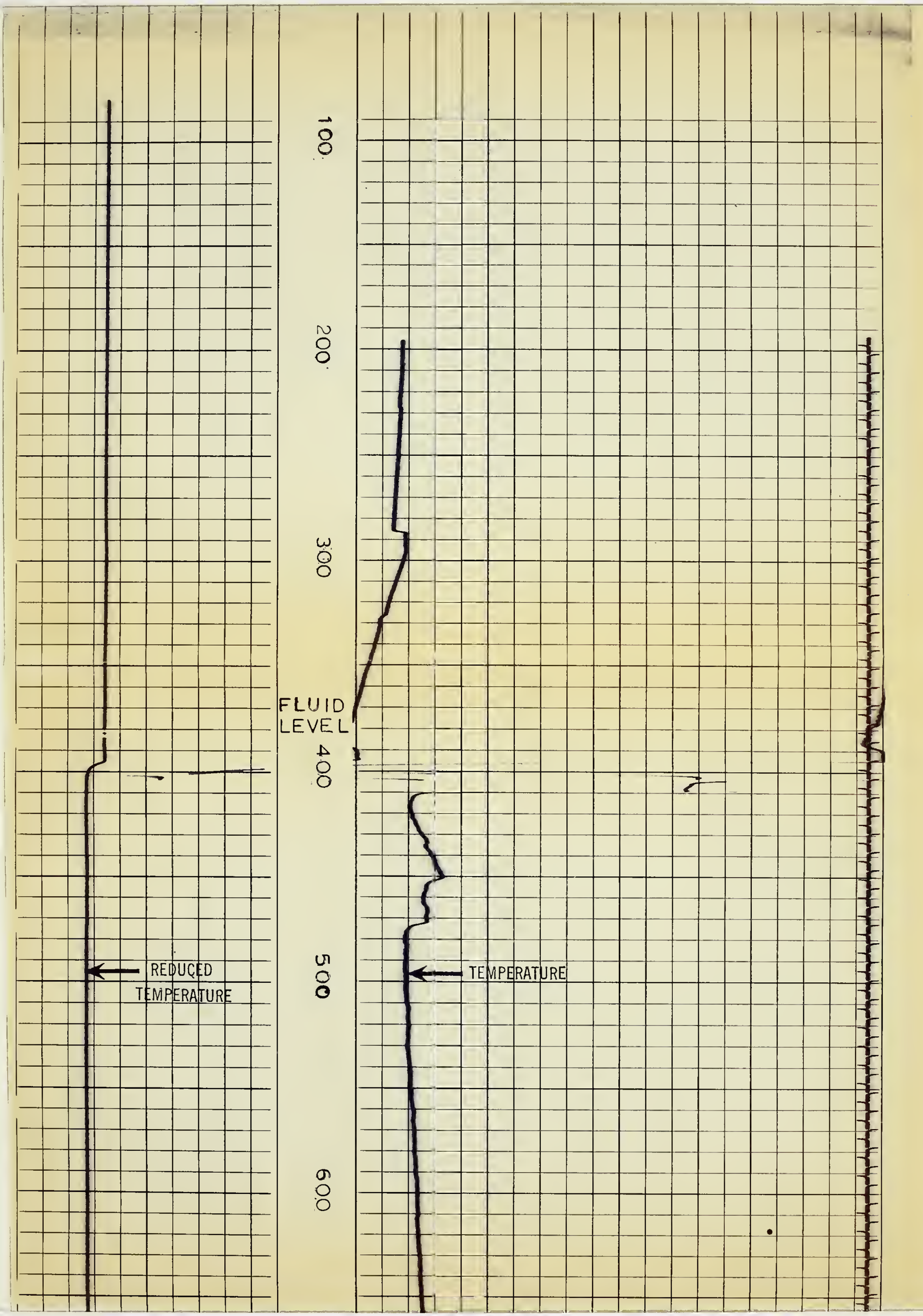
Schlumberger

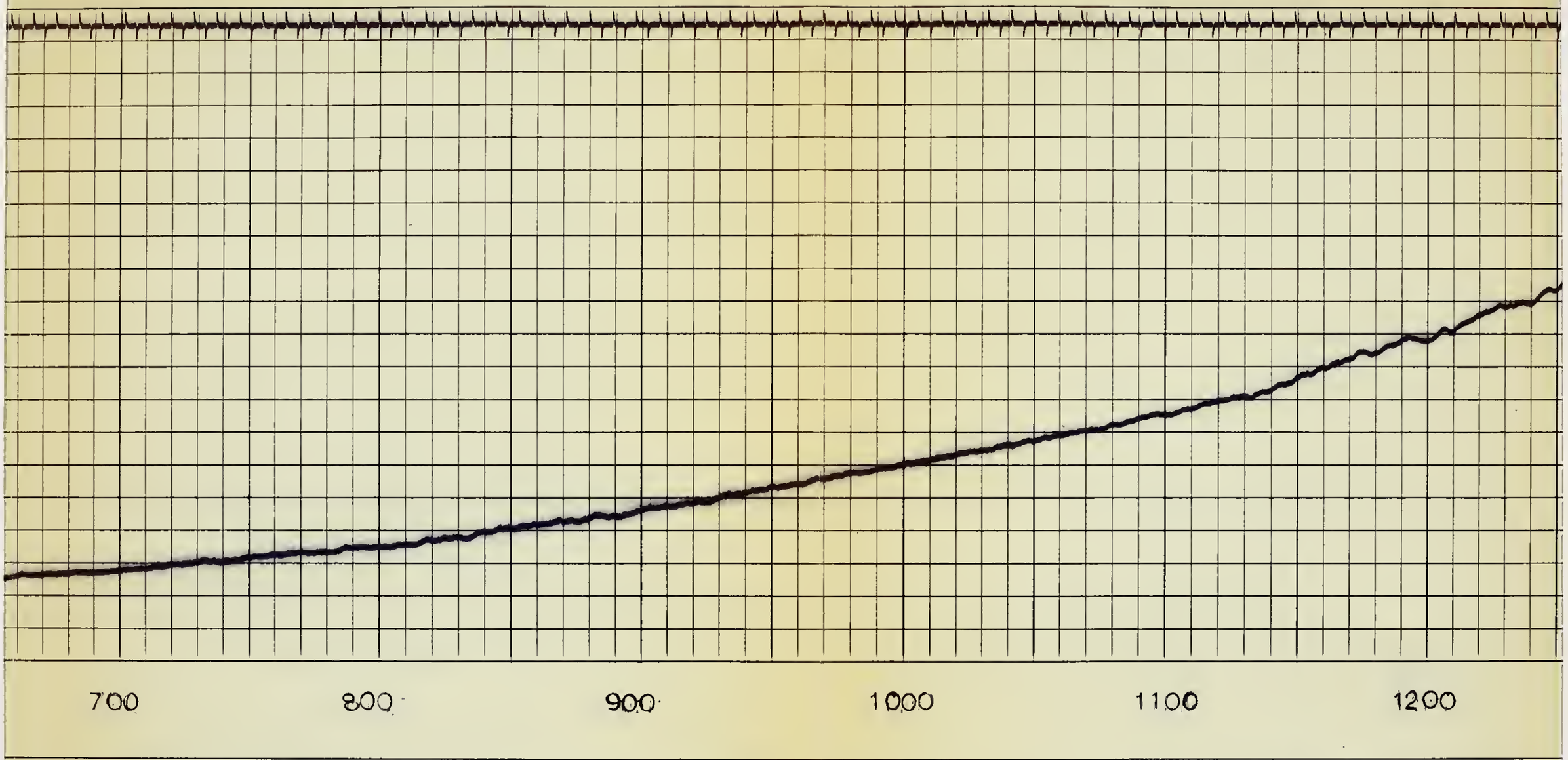
# TEMPERATURE

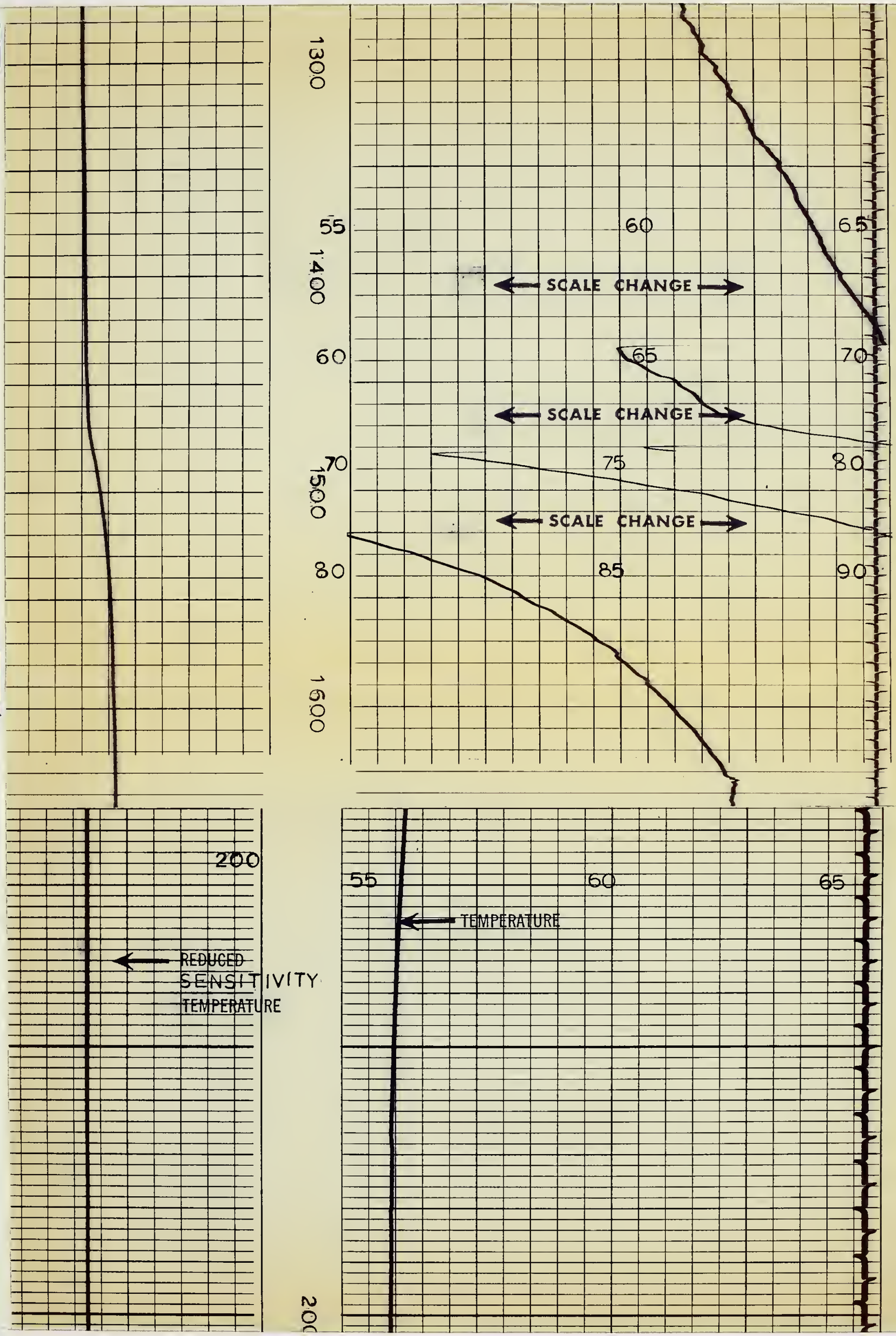
| | RUN # 1 | RUN # | RUN # | RUN # | RUN # |
|---|---|---|---|---|---|
| | PASS # 1 | PASS # | PASS # | PASS # | PASS # |
| Dote | 7/28/74 | | | | |
| Praduction Methad | STATIC | | | | |
| Stabil. time befare lag | | | | | |
| Haurs lag began | | | | | |
| Battam lagged interval | | | | | |
| Tap lagged interval | | | | | |
| Film lagged "UP" or "DOWN" | | | | | |
| THP Static psi | | | | | |
| THP Dynamic psi | | | | | |
| BHP Static psi | | | | | |
| BHP Dynamic psi | | | | | |
| Well head temp. °F | | | | | |
| Surf. Prad. Rate | | | | | |
| Surf. Injectian Rate | | | | | |
| | | | | | |

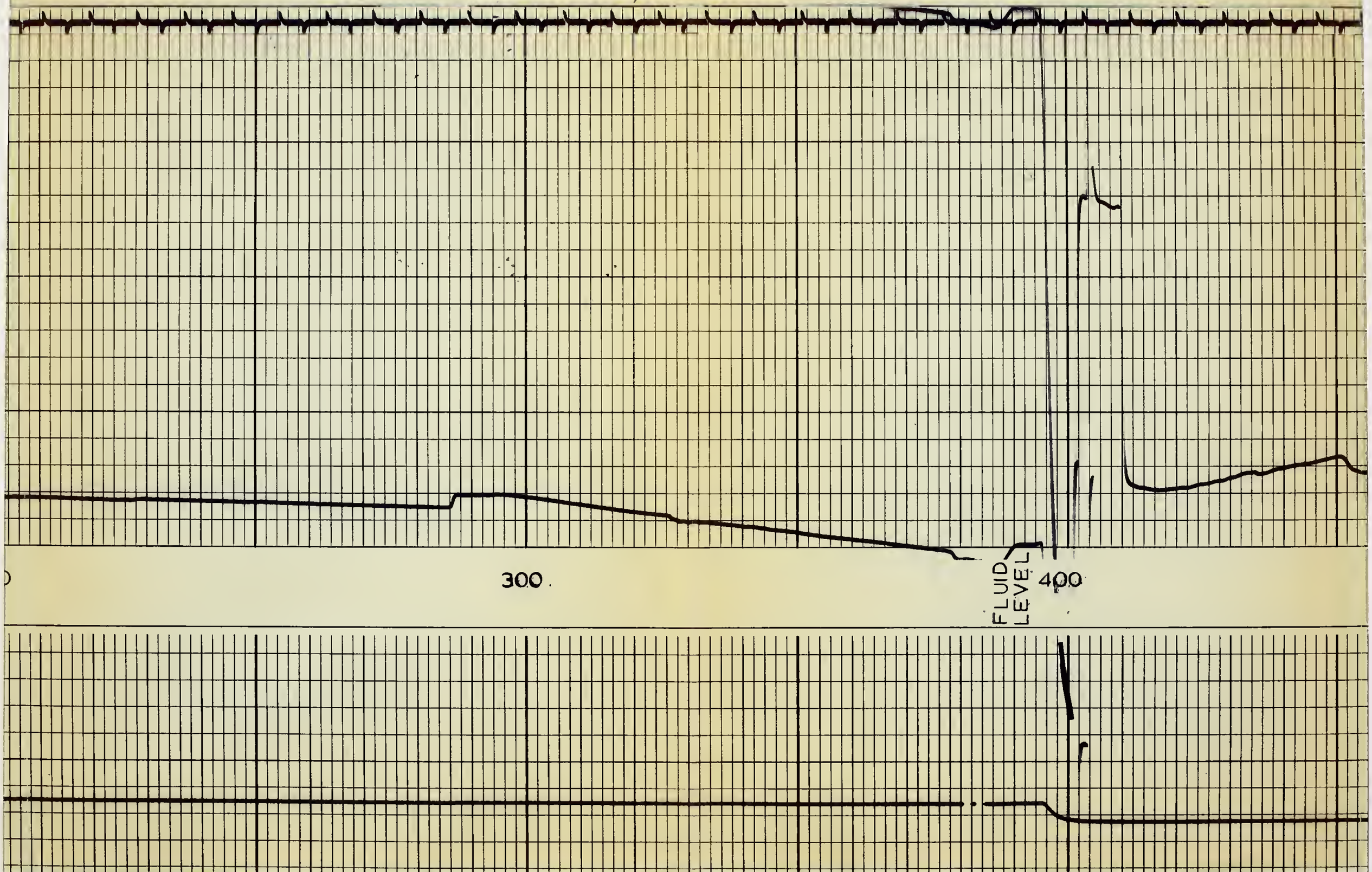
| SURFACE EQUIPMENT | | DOWNHOLE EQUIPMENT | | | | | | |
|---|---|---|---|---|---|---|---|---|
| PPU 762 | TEP | CEC | FAC | CCL | FLOWMETER | CFS | SSA FAA | FBS |
| PRU | GNP | CCE | FAA | GNT-K | Spinner Size | | | |
| PCU | ETU | MTS | HUM | SGT-G | Spinner Pitch | | | |
| HTU | CFP | GMS | SSA | ETC | REMARKS | | | |
| GMU | | TCS | PSA | ETS | | | | |
| CFU | | FBS | MSA | PAC-A | | | | |
| CMU | | CFS | TEE | HTS-B | | | | |
| FAU | | PRC | TEC | TTC | | | | |

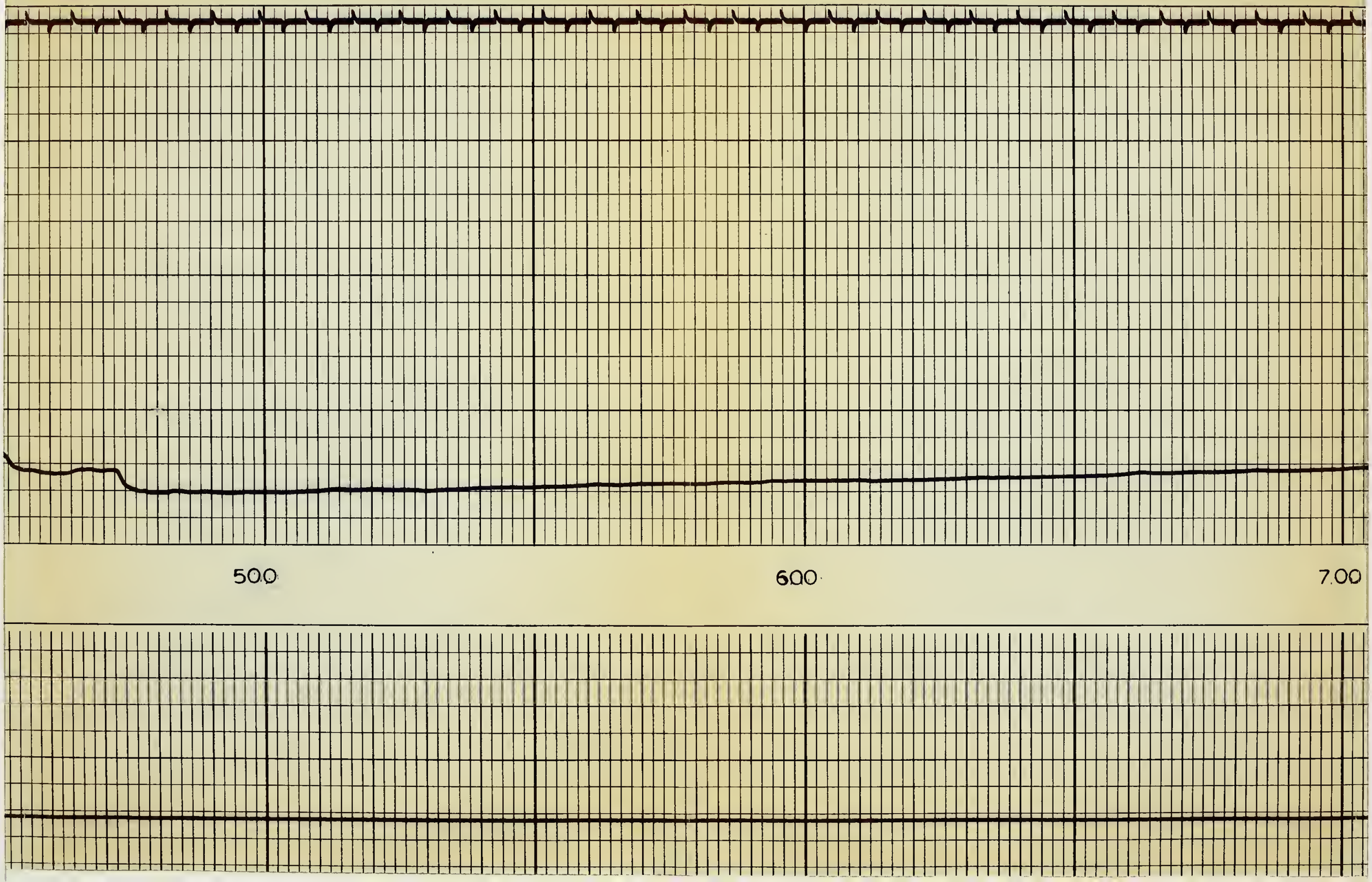


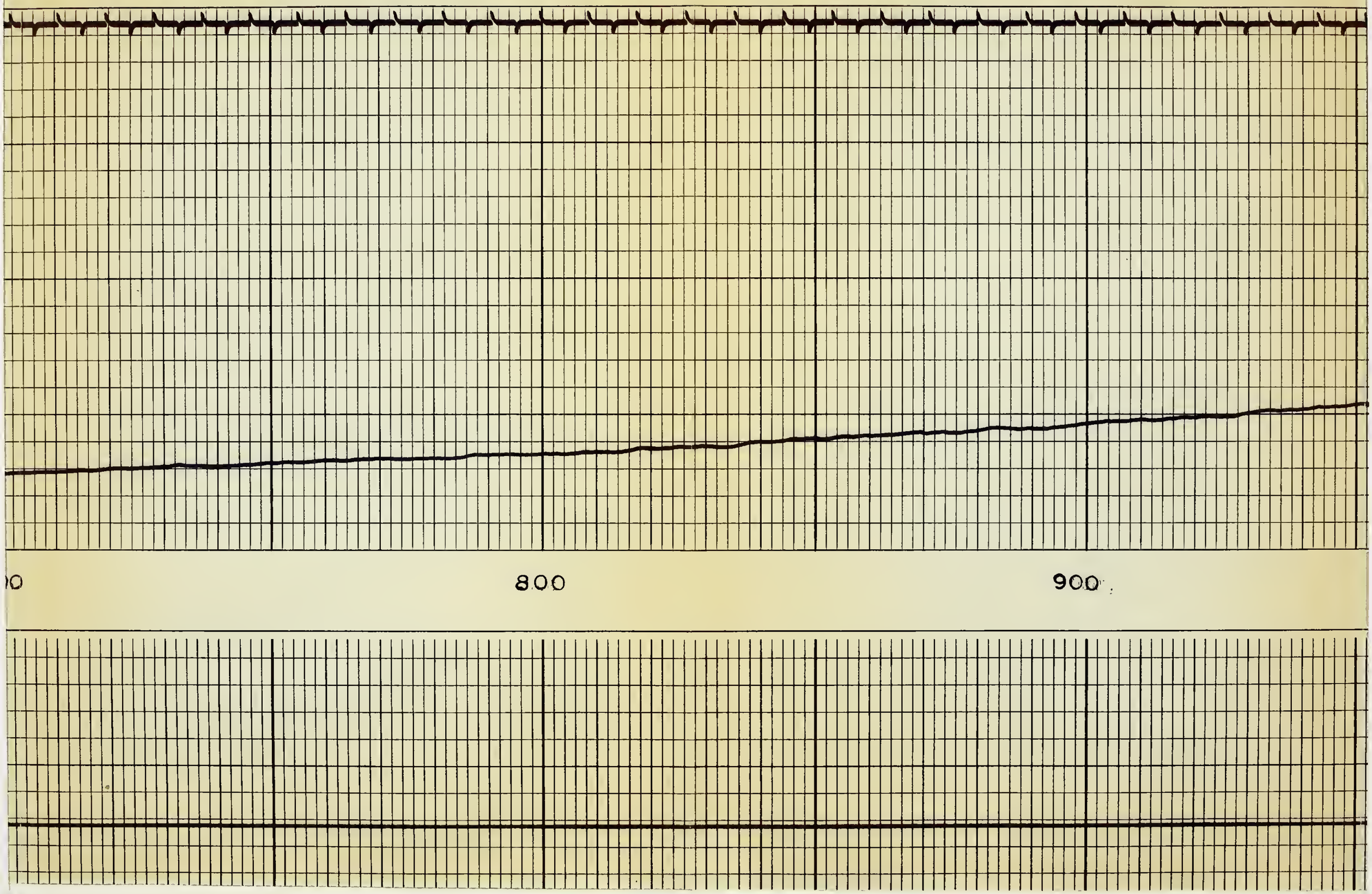

100
200
300
FLUID
LEVEL
400
500
600
REDUCED
TEMPERATURE
TEMPERATURE


700
800
900
1000
1100
1200

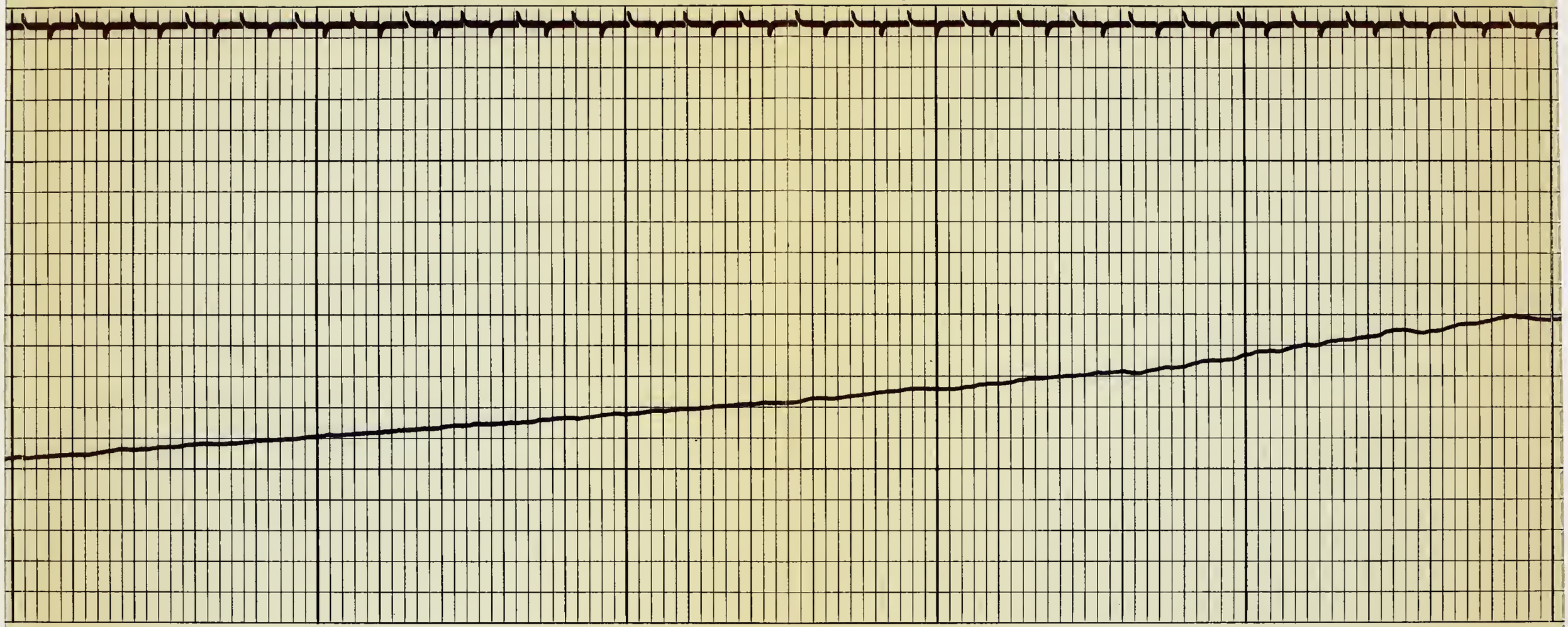

1300
55
1400
60
70
1500
80
1600
60
65
SCALE CHANGE
65
70
SCALE CHANGE
75
80
SCALE CHANGE
85
90
200
REDUCED
SENSITIVITY
TEMPERATURE
55
60
65
TEMPERATURE
200

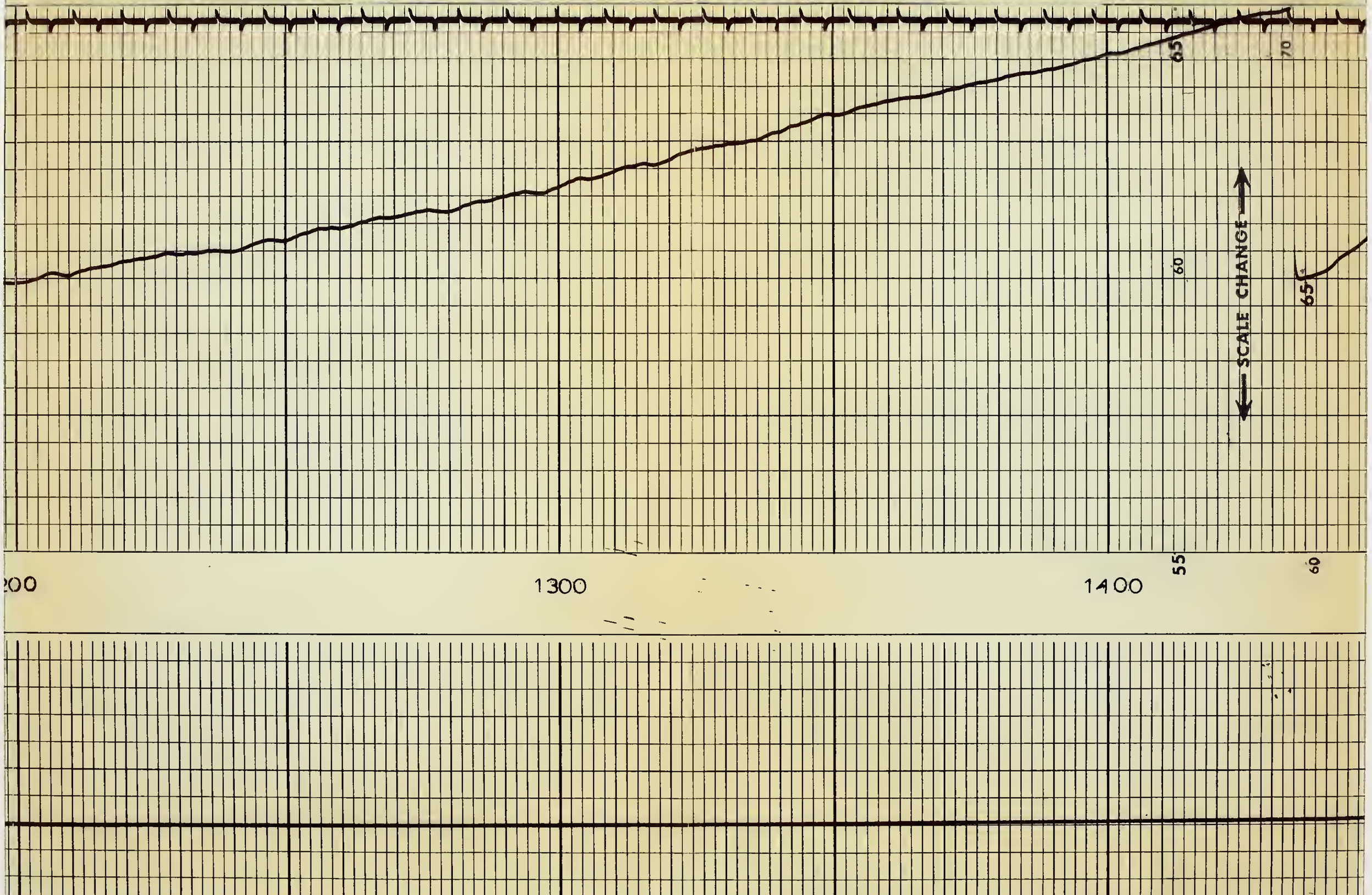

300
FLUID LEVEL
400


500
600
7.00



800
900


1000
1100
120


65
70
60
SCALE CHANGE
65
55
60
200
1300
1400

REDUCED
TEMPERATURE
SCALE

1600

70

75

80

← SCALE CHANGE →

80

85

90

← SCALE CHANGE →

TEMPERATURE →

1600

COMPANY ATLANTIC RICHFIELD

WELL SORGHUM GULCH AQUIFER TEST 1-D

FIELD

Schlumberger

PRODUCTION LOGGING SERVICES

# ENGINEERED PRODUCTION LOGGING

Schlumberger

COMPANY ATLANTIC RICHFIELD COMPANY

WELL SORGUN GULCH NO. 10

FIELD ----

COUNTY RIO BLANCO STATE COLORADO

LOCATION: 97'FNL, 184'FEL

Sec. 13 Twp. 3S Rge. 92W

SERVICES RUN:

Permanent Datum: GL

Elev.: ----

Log Measured From: GL

Drilling Measured From: GL

ELEVATION:

KB ----

DF ----

GL ----

Equipment Location: 5602-GRAND JUNCTION

Recorded by: SCHNORR 7-21-74

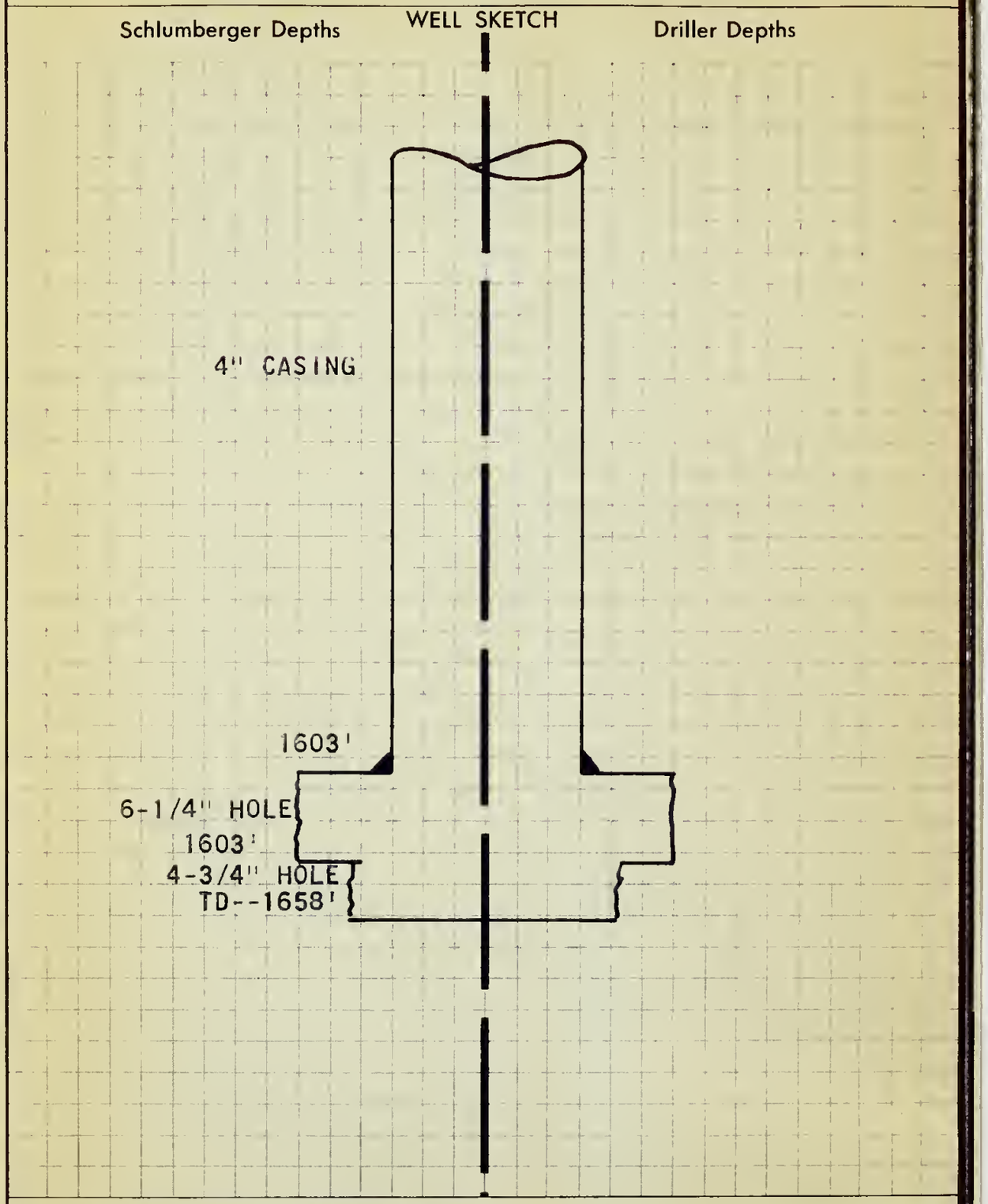
Witnessed by: BARRET

SWS-1424-C

FOLD HERE

The well name, location and borehole reference data were furnished by the customer.

Log depths of these records relate to: ☐ Schlumberger line measurements,
☐ correlated by CCL to Radioactivity Log Measurements.




Indicate:
- Hole deviation in production zone
- Open hole diameter
- Diameter and weight of casing and tubing
- Position & nature of perforations (bullets, conventional SC, capsules, etc.)

**Schlumberger**

# TEMPERATURE

| | RUN # 1 | RUN # 2 | RUN # | RUN # | RUN # |
|---|---|---|---|---|---|
| | PASS # | PASS # | PASS # | PASS # | PASS # |
| Dote | 7-21-74 | 7-21-74 | | | |
| Production Method | STATIC | ---- | | | |
| Stabil. time before log | | | | | |
| Hours lag began | 23:30 | 00:30 | | | |
| Bottom lagged interval | 1662 | 1662 | | | |
| Top lagged intervol | 250 | 1480 | | | |
| Film lagged "UP" or "DOWN" | DOWN | UP | | | |
| THP Static psi | | | | | |
| THP Dynamic psi | | | | | |
| BHP Static psi | | | | | |
| BHP Dynamic psi | | | | | |
| Well heod temp. °F | | | | | |
| Surf. Prod. Rate | | | | | |
| Surf. Injection Rote | | | | | |

| SURFACE EQUIPMENT | | DOWNHOLE EQUIPMENT | | | |
|---|---|---|---|---|---|
| PPU | TEP | CEC | FAC | CCL | FLOWMETER CFS SSA FAA FBS |
| PRU | GNP | CCE | FAA | GNT-K | Spinner Size |
| PCU | ETU | MTS | HUM | SGT-G | Spinner Pitch |
| HTU | CFP | GMS | SSA | ETC | REMARKS |
| GMU | | TCS | PSA | ETS | LOG WAS RUN TO DETERMINE |
| CFU | | FBS | MSA | PAC-A | IF THERE WAS COMMUNICAT- |
| CMU | | CFS | TEE | HTS-B | ION BEHIND CASING. |
| FAU | | PRC | TEC | TTC | |

REDUCED SCALE TEMP. INCREASING →

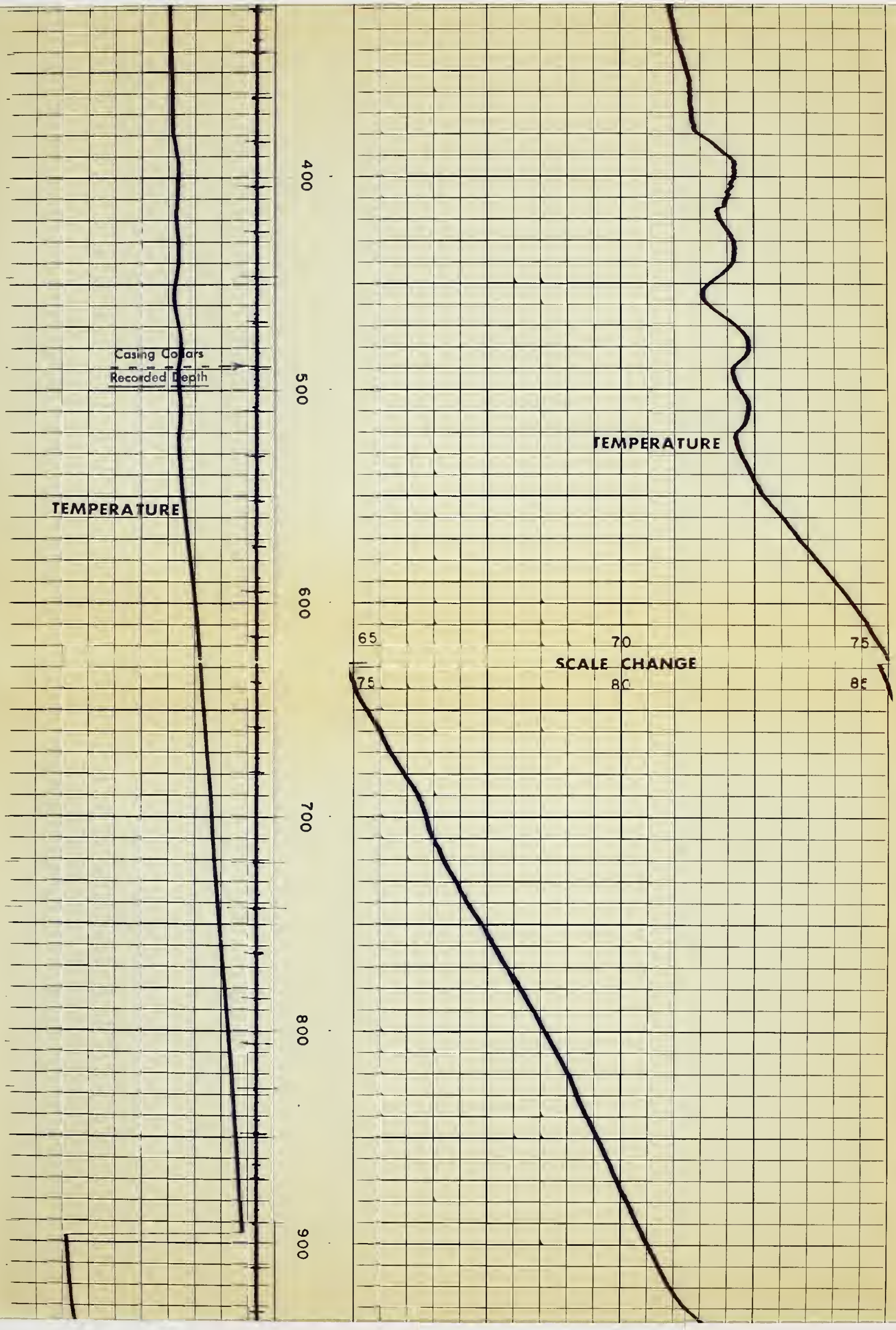
CASING COLLARS RECORDED 6' DEEP →

DEPTHS

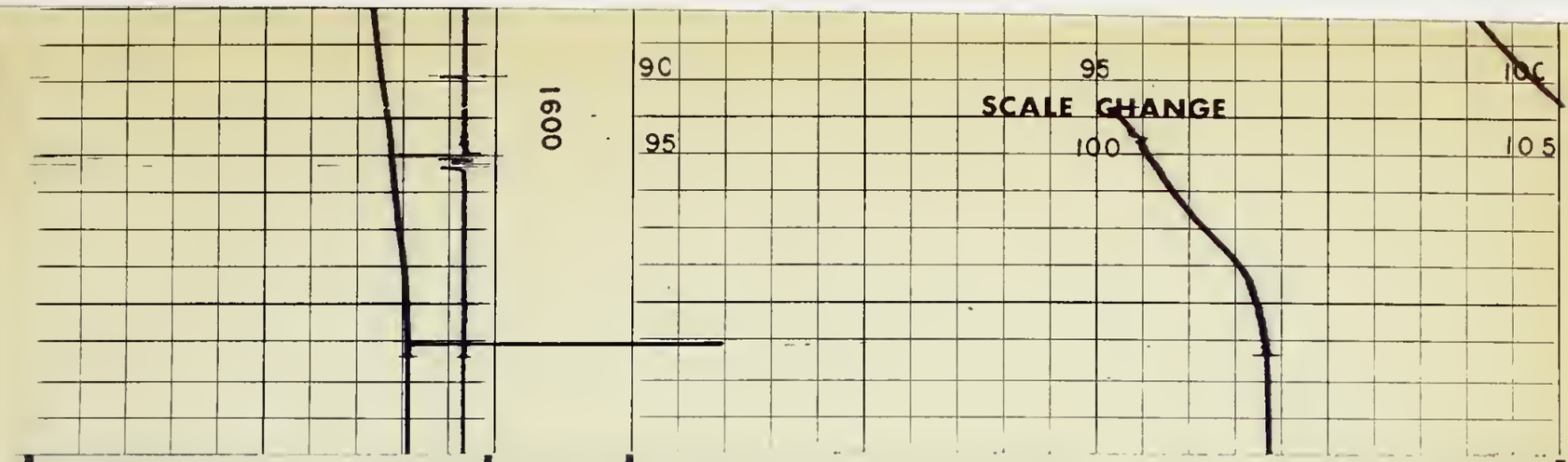
TEMPERATURE °F

65 70 75

300


Casing Collars
Recorded Depth
TEMPERATURE
400
500
600
700
800
900
65
70
75
SCALE CHANGE
75
80
85
TEMPERATURE

1000
1100
1200
1300
1400
1500
75
80
85
SCALE CHANGE
85
90
95
Casing Collars
Recorded Depth
TEMPERATURE
TEMPERATURE
85
90
95
SCALE CHANGE
90
95
100




CASING COLLARS
RECORDED 6' DEEP

REDUCED SCALE TEMP.

95 100 105

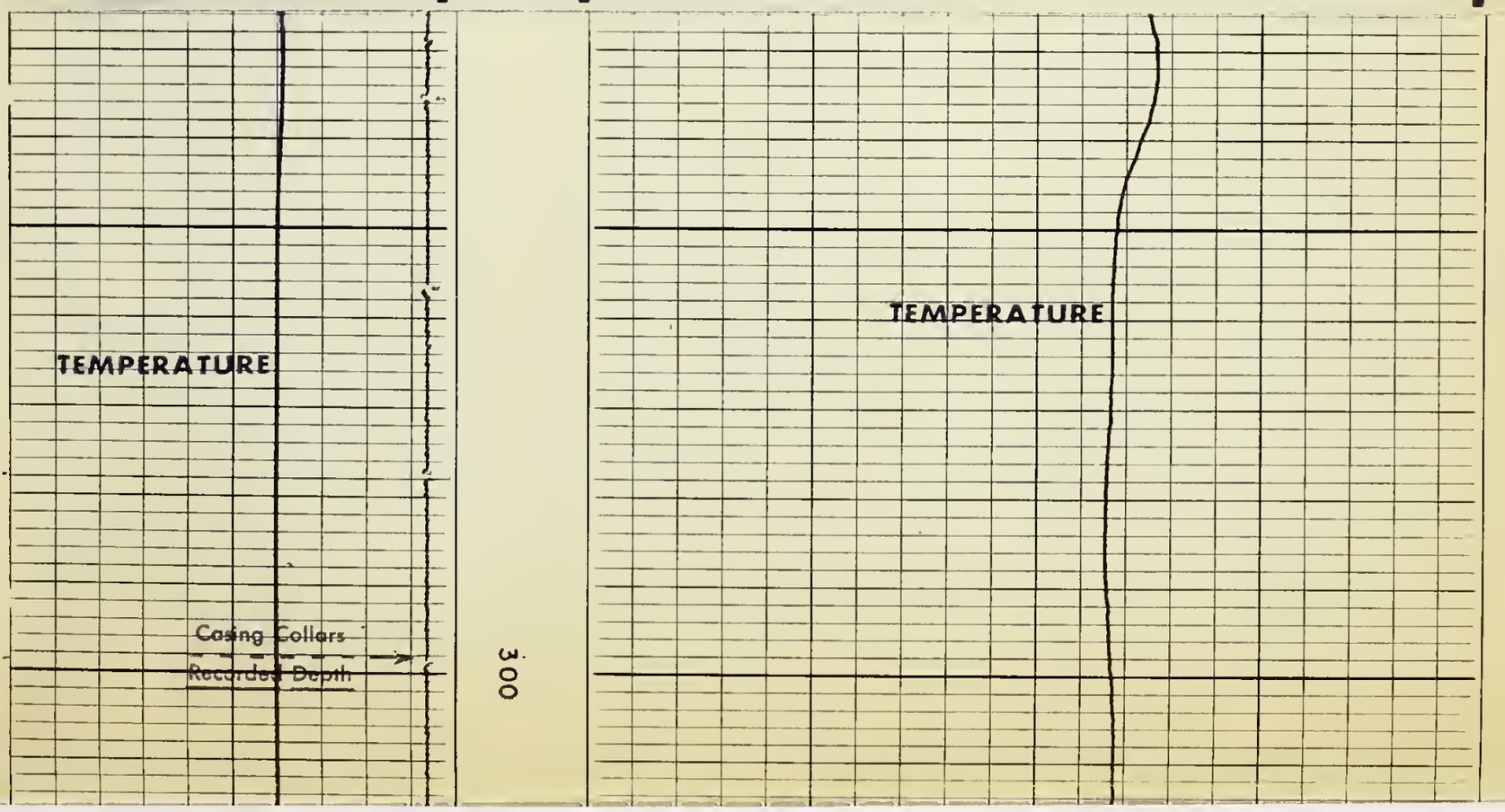
TEMPERATURE
°F

REDUCED SCALE TEMP.

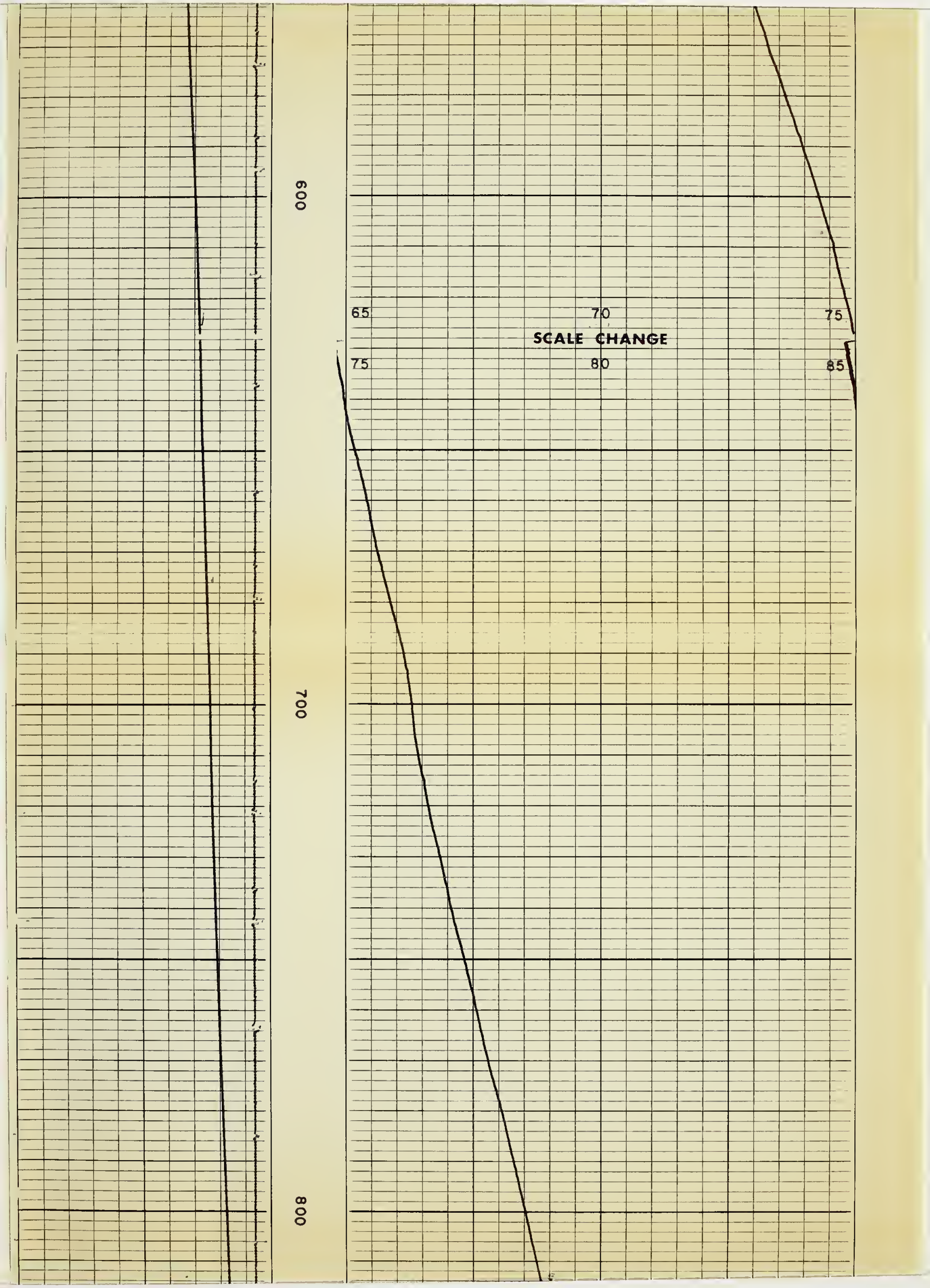
TEMPERATURE
°F

65 70 75

CASING COLLARS
RECORDED 6' DEEP

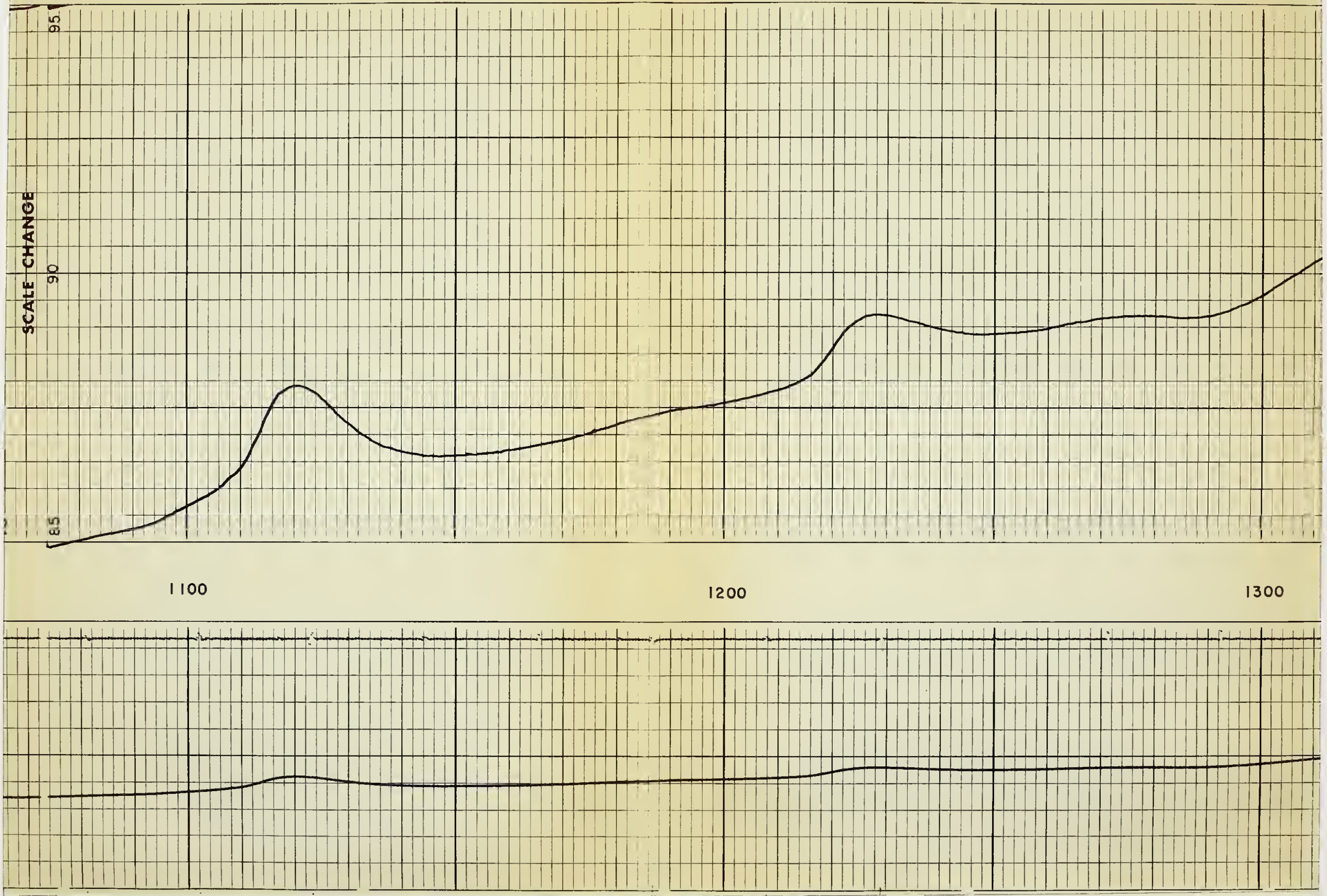


400
500


600
700
800
65
70
75
SCALE CHANGE
75
80
85

900

1000


SCALE CHANGE
95
90
85
1100
1200
1300

1400

1500

TEMPERATURE

85

90

90

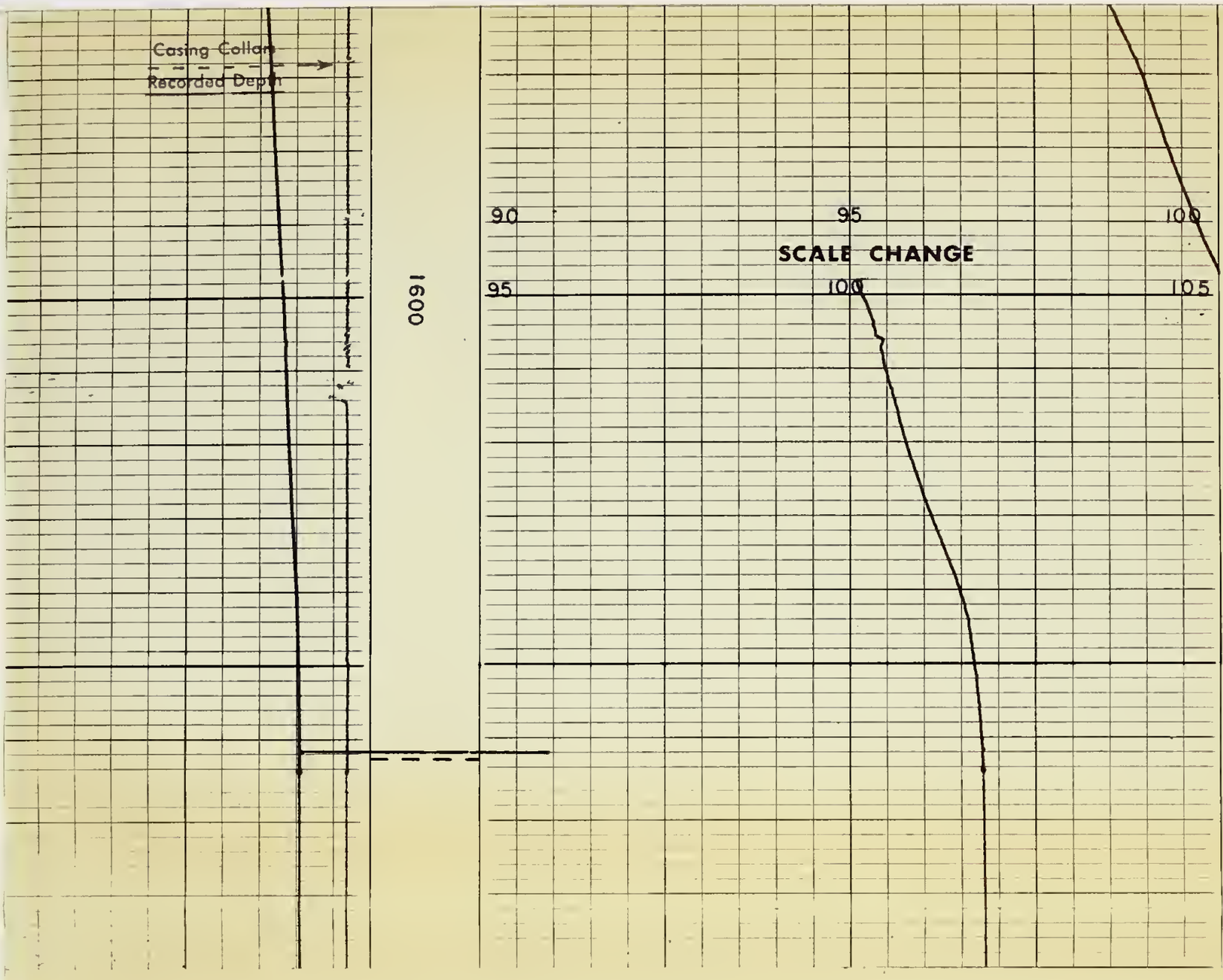
95

SCALE CHANGE

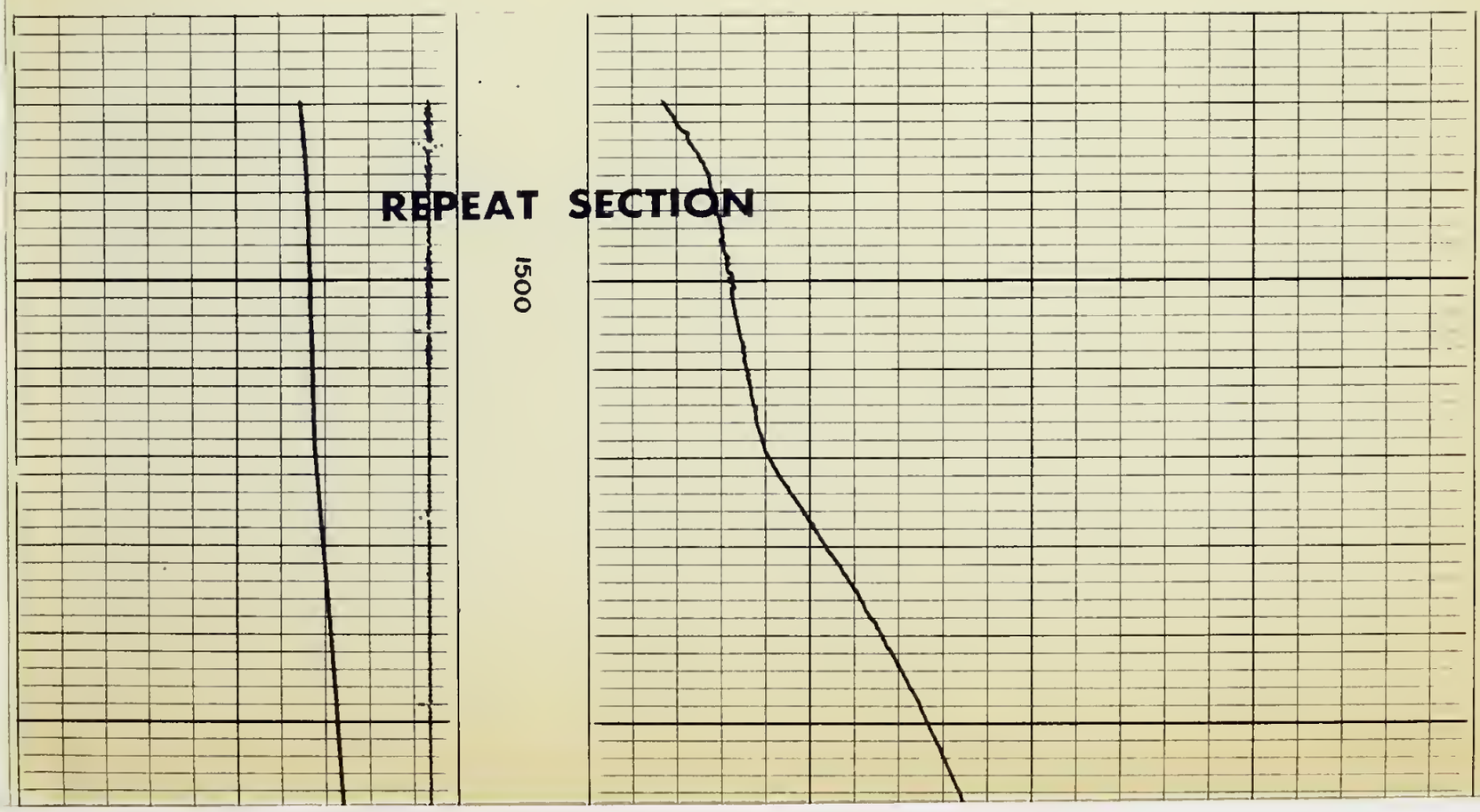
95

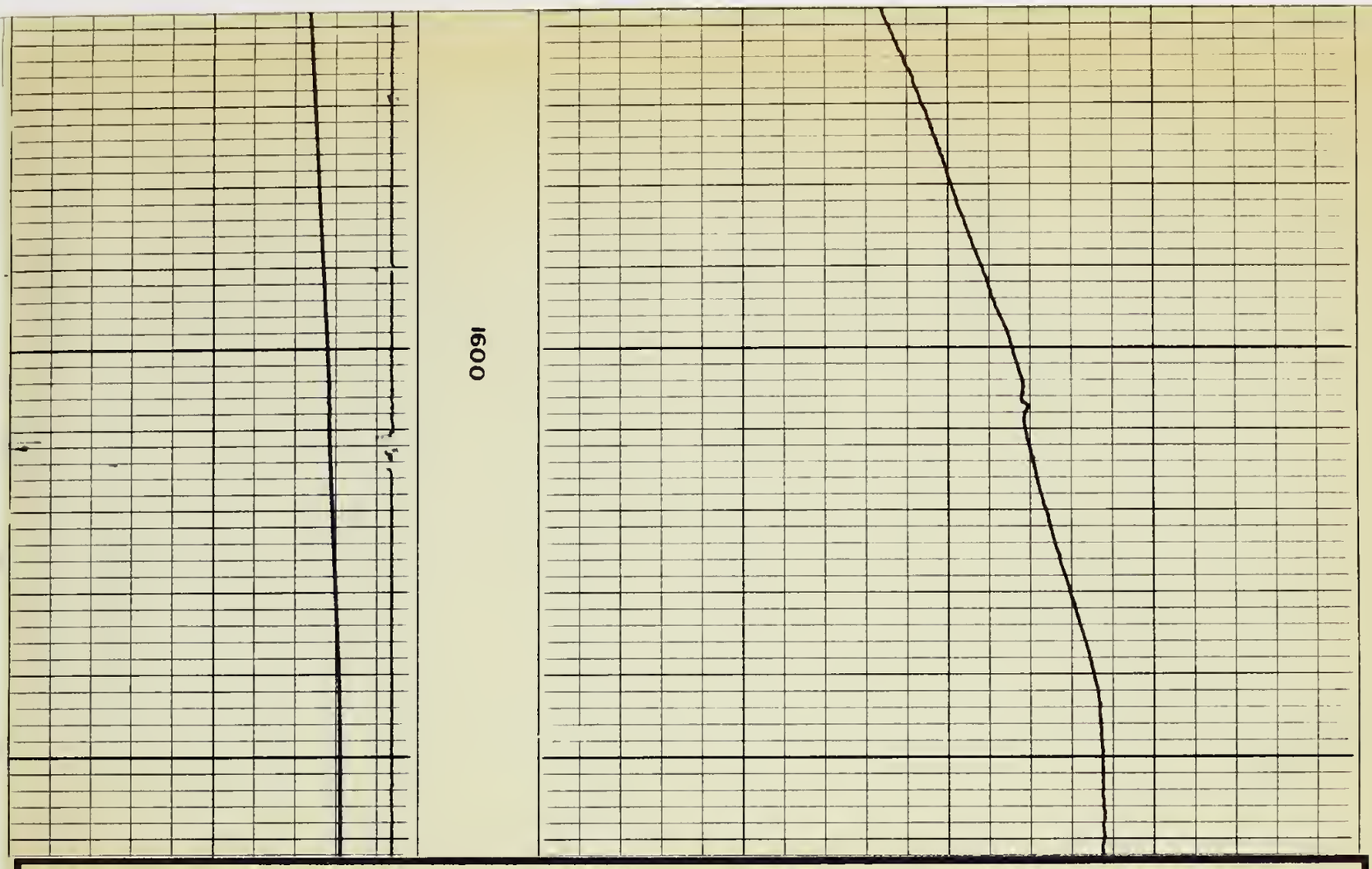
100

TEMPERATURE




REPEAT SECTION






COMPANY THE ATLANTIC RICHFIELD COMPANY

WELL SORGUM GULCH NO. 10

FIELD ----

COUNTY RIO BLANCO STATE COLORADO

Elev:
KB
DF
GL ----

# Birdwell

## Electric Log

Birdwell DIVISION

**COMPANY** ATLANTIC RICHFIELD COMPANY, ET, AL.

**WELL** SORGHUM GULCH #H-10

**FIELD**

**COUNTY** RIO BLANCO **STATE** COLORADO

**LOCATION:** 97' FNL & 184' FEL

SEC. 13 TWP. 3S RGE. 97W

**OTHER SERVICES:** CAL FDL V3D TL GR/ENP

PERMANENT DATUM GROUND LEVEL ELEV. 6950' ELEV. K.B.

LOG MEASURED FROM GL , FT. ABOVE PERM. DATUM D.F.

DRILLING MEASURED FROM GL G.L. 6950'

| | | | | |
|---|---|---|---|---|
| DATE | 29 JUNE 74 | | | |
| RUN NO. | 1 | | | |
| DEPTH—DRILLER | 2211 | | | |
| DEPTH—LOGGER | 2206 | | | |
| BTM. LOG INTER. | 2204 | | | |
| TOP LOG INTER. | 450 | | | |
| CASING—DRILLER | 7" @ 62' | @ | @ | @ |
| CASING—LOGGER | 62 | | | |
| BIT SIZE | 5-5/8" 62'-1200' 4-7/8" | | | |
| TYPE FLUID IN HOLE | WATER | | | |
| DENS. \| VISC. | | | | |
| pH \| FLUID LOSS | ml | ml | ml | ml |
| SOURCE OF SAMPLE | PIT | | | |
| Rm @ MEAS. TEMP. | 6.0 @ 60 °F | @ °F | @ °F | @ °F |
| Rmf @ MEAS. TEMP. | @ °F | @ °F | @ °F | @ °F |
| Rmc @ MEAS. TEMP. | @ °F | @ °F | @ °F | @ °F |
| SOURCE Rmf \| Rmc | | | | |
| Rm @ B.H.T. | 98 °F | @ °F | @ °F | @ °F |
| TIME SINCE CIRC. | 11 HRS. | | | |
| MAX. REC. TEMP. | 98 °F | °F | °F | °F |
| EQUIP. \| LOCATION | 2694 \| LAS VEGAS | | | |
| RECORDED BY | WILSON | | | |
| WITNESSED BY | TAIT | | | |

THIS HEADING AND LOG CONFORM TO API RP-31 ®

SSC-605-C

**REMARKS** NA-NOT AVAILABLE

CHANGES IN MUD TYPE OR ADDITIONAL SAMPLES

| | | | | |
|---|---|---|---|---|
| DATE \| SAMPLE NO. | | | | |
| DEPTH—DRILLER | | | | |
| TYPE FLUID IN HOLE | | | | |
| DENS. \| VISC. | | | | |
| pH \| FLUID LOSS | ml | ml | ml | ml |
| SOURCE OF SAMPLE | | | | |
| Rm @ MEAS. TEMP. | @ °F | @ °F | @ °F | @ °F |
| Rmf @ MEAS. TEMP. | @ °F | @ °F | @ °F | @ °F |
| Rmc @ MEAS. TEMP. | @ °F | @ °F | @ °F | @ °F |
| SOURCE Rmf \| Rmc | | | | |
| Rm @ B.H.T. | @ °F | @ °F | @ °F | @ °F |
| Rmf @ B.H.T. | @ °F | @ °F | @ °F | @ °F |
| Rmc @ B.H.T. | @ °F | @ °F | @ °F | @ °F |

| | | | | |
|---|---|---|---|---|
| TYPE LOG | | | | |
| RUN NO. | | | | |
| TOOL POSITION | ONE | | | |
| PAD TYPE | FREE | | | |
| TOOL TYPE | E LOG | | | |

EQUIPMENT DATA

SCALE CHANGES

| | | | |
|---|---|---|---|
| DEPTH | | | |
| SCALE UP HOLE | | | |
| SCALE DOWN HOLE | | | |

OTHER

**SPONTANEOUS-POTENTIAL** MILLIVOLTS

−25+

**DEPTHS**

**RESISTIVITY** OHMS M²/M

| | | |
|---|---|---|
| 0 | 16" NORMAL | 500 |
| 0 | | 5000 |
| 0 | 64" NORMAL | 500 |
| 0 | | 5000 |

**RESISTIVITY** OHMS M²/M

| | | |
|---|---|---|
| 0 | 18'8" LATERAL | 500 |
| 0 | | 5000 |

0 5000

CALIBRATION DATA

AFTER LOG

SP

100 MV

0

16" NORMAL 500

X10

0

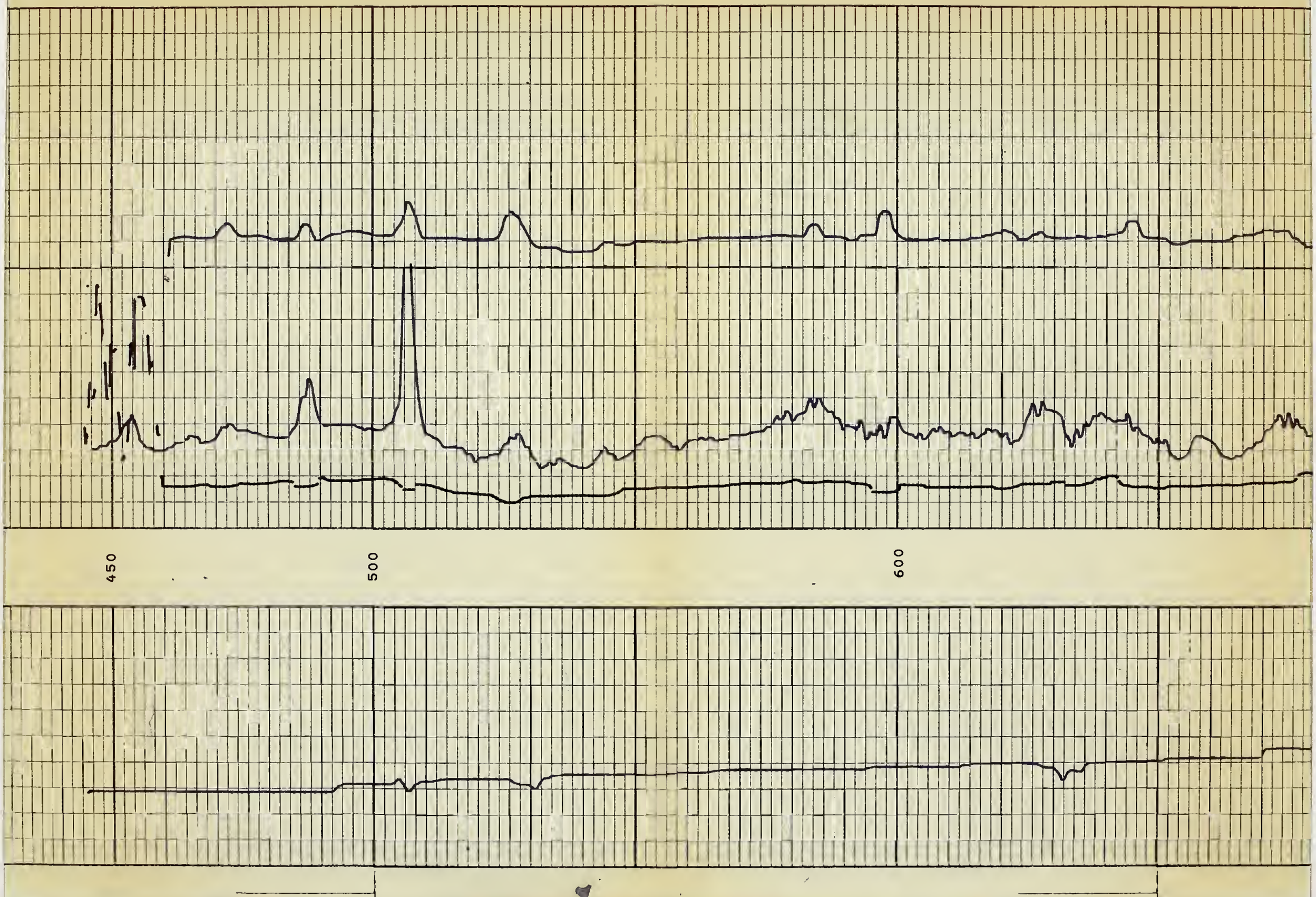
64" NORMAL 500

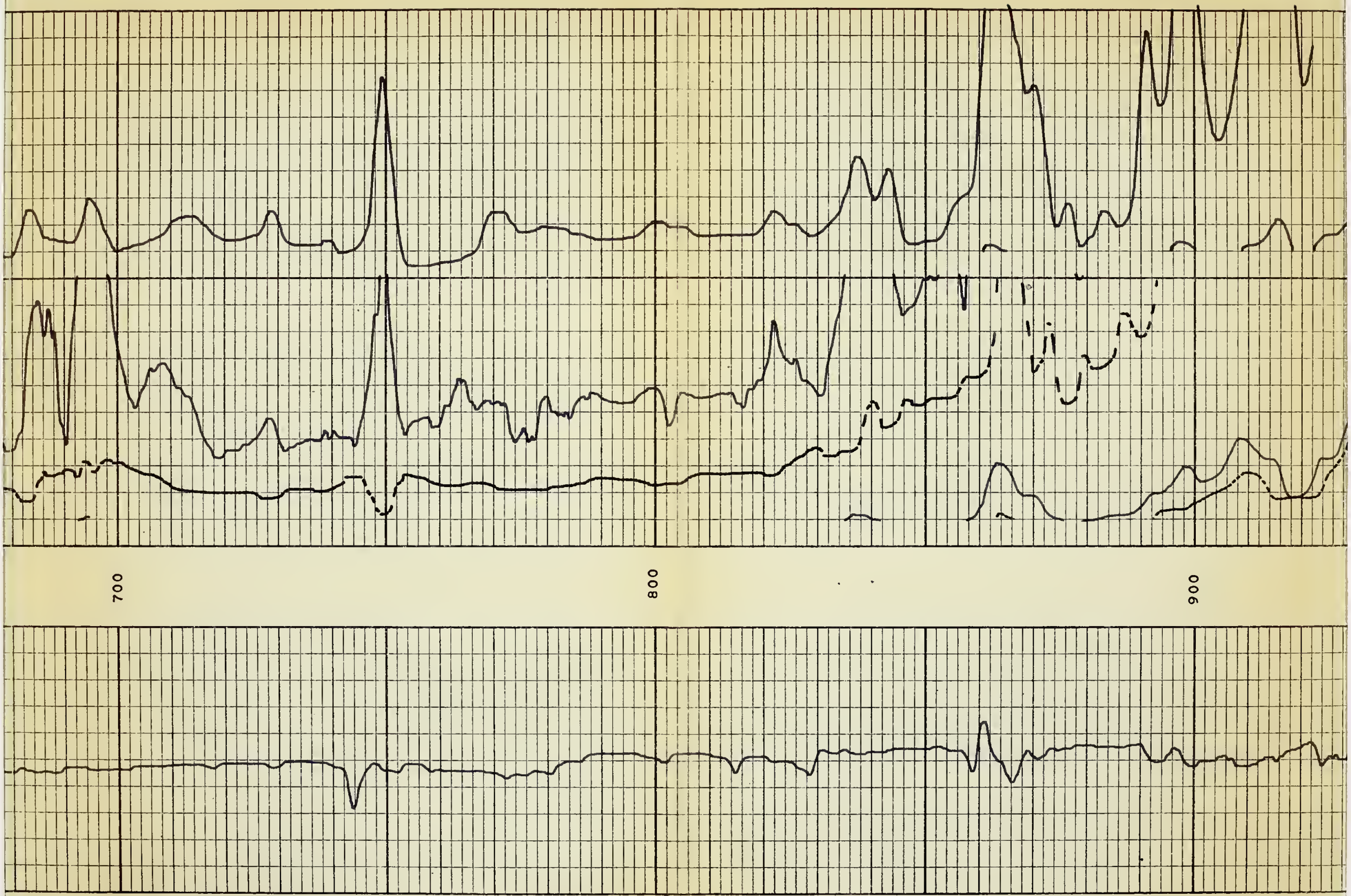
X10

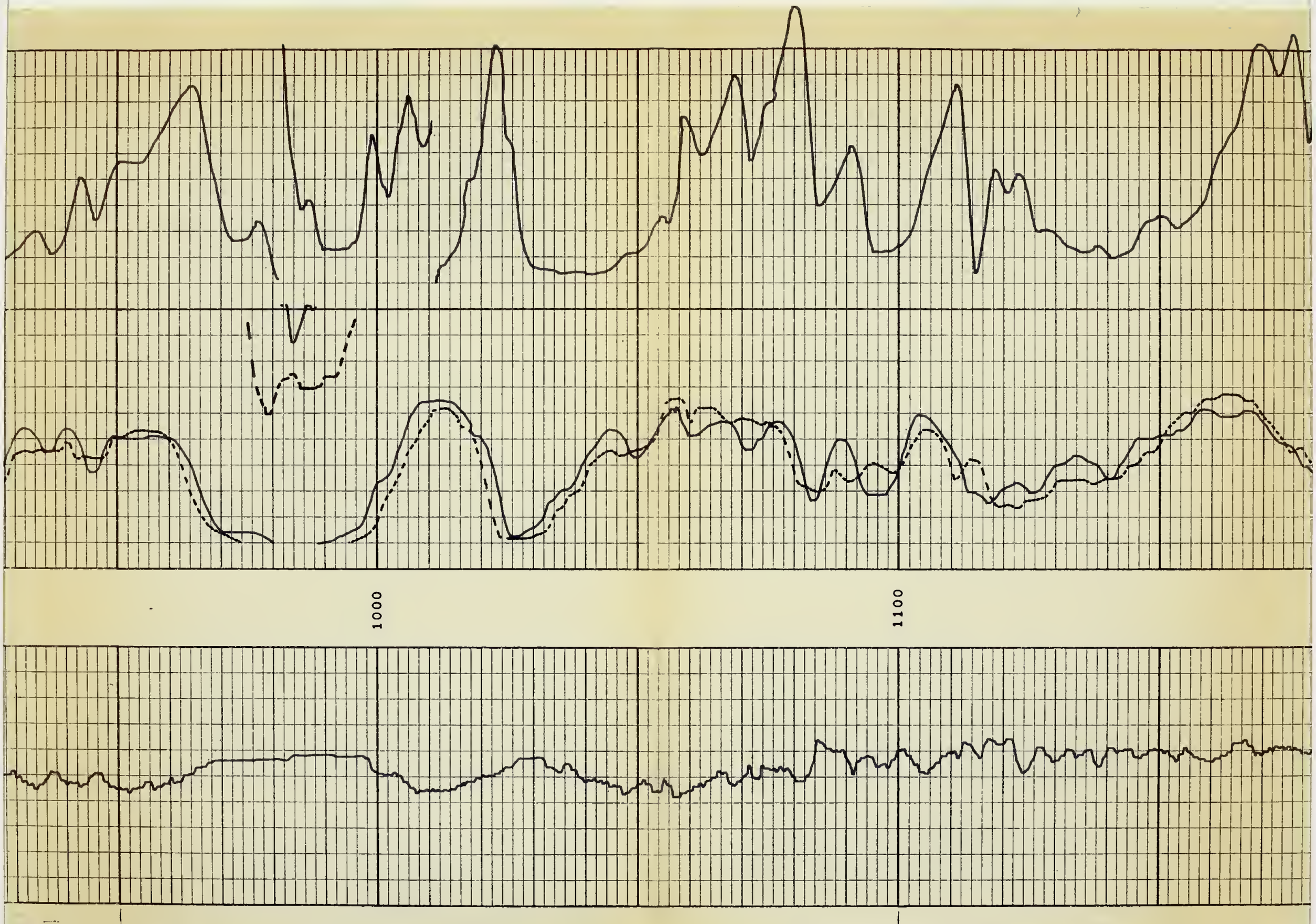
0

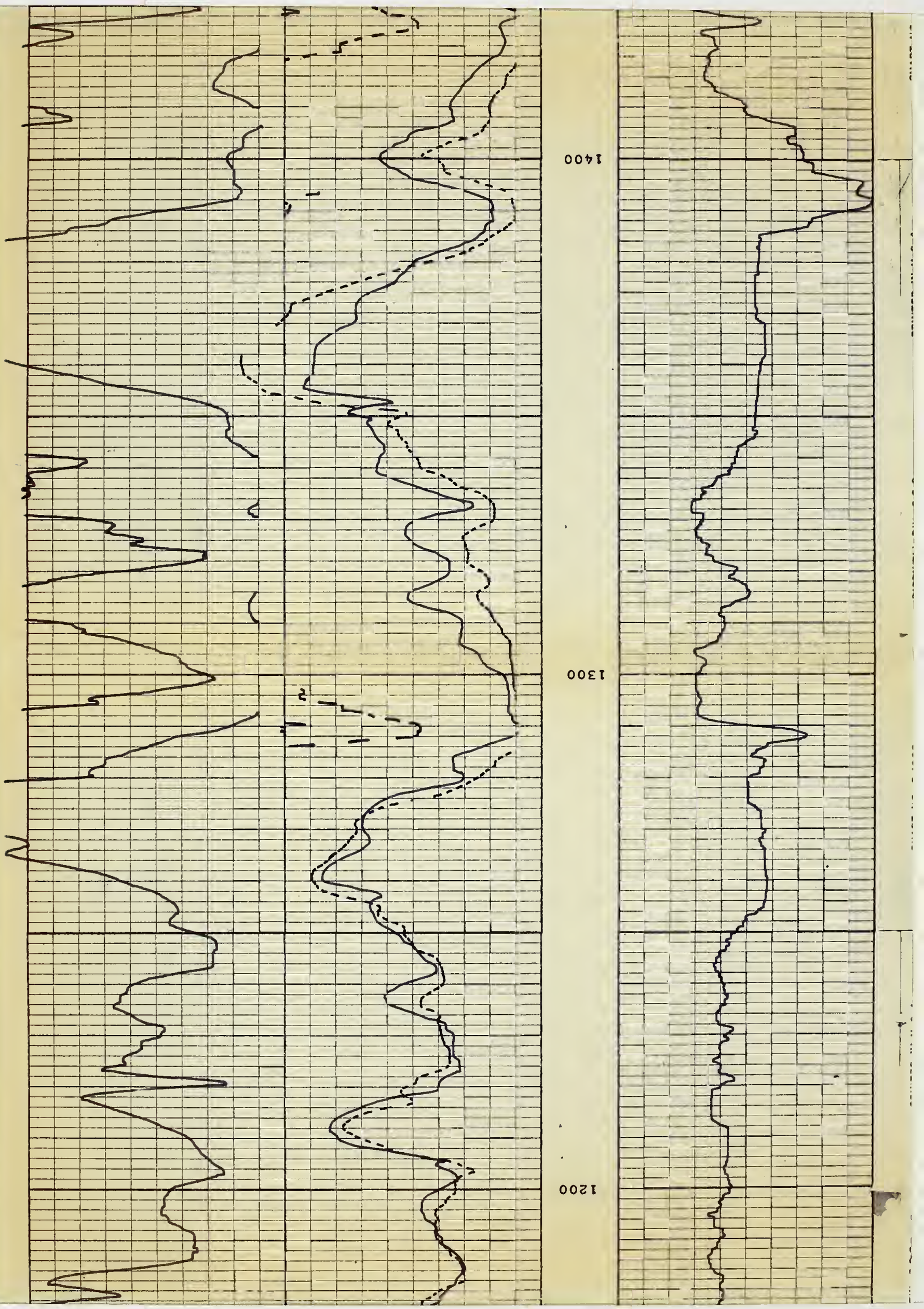
18'8" LATERAL 500

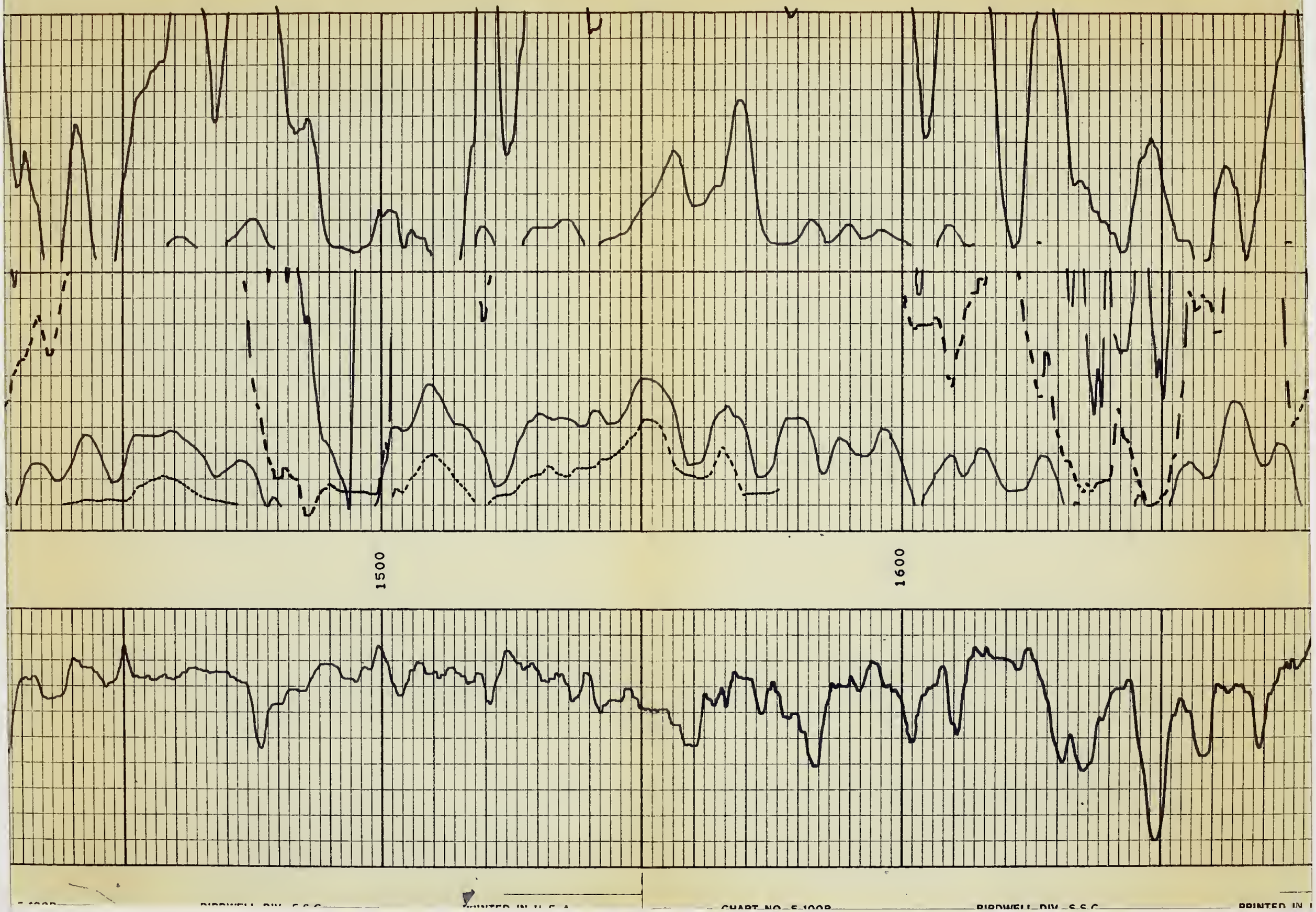
X10


450
500
600


700
800
900


1000
1100


1400
1300
1200


1500
1600

1700

1800

1900

IN U.S.A. CHART NO. 5-100B BIRDWELL DIV. S.S.C. PRINTED IN U.S.A. CHART NO. 5-100B BIRDWELL D

2000

2100

L DIV., S.S.C. PRINTED IN U. S. A. CHART NO. 5-100B BIRDWELL DIV., S.S.C. PRINTED IN U. S. A. CHART N

O. 5-100B

BIRDWELL DIV., S.S.C.

PRINTED IN U.S.A.

CHART NO. S-100B

SP

100 MV

2200
T.D.
2206'

R.D. 2204'

CALIBRATION DATA

BEFORE LOG

0 16" NORMAL 500

X10

0 64" NORMAL 500

X10

0 18'8" LATERAL 500

X10

# Birdwell

## 3-Dimensional Velocity Log

FILING NO.

COMPANY ATLANTIC RICHFIELD COMPANY, ET. AL.

WELL SORGHUM GULCH #H-10

FIELD

COUNTY RIO BLANCO STATE COLORADO

LOCATION: 97' FNL & 184' FEL

SEC. 13 TWP. 3S RGE. 97W

OTHER SERVICES: CAL FDL TL ES GR/ENP

ELEVATIONS

PERMANENT DATUM GROUND LEVEL ELEV. 6950'

LOG MEASURED FROM GL — KB.

DRILLING MEASURED FROM GL — DF.

GL. 6950'

| | | | |
|---|---|---|---|
| DATE | 29 JUNE 74 | 29 JUNE 74 | |
| RUN NO. | 1 | 2 | |
| TYPE LOG--BOND OR VEL. | V3D | V3D | |
| DEPTH — DRILLER | 2211 | 2211 | |
| DEPTH — LOGGER | 2206 | 2206 | |
| BOTTOM LOGGED INTERVAL | 2200 | 2200 | |
| TOP LOGGED INTERVAL | 450 | 450 | |
| TYPE FLUID IN HOLE | WATER | WATER | |
| SALINITY PPM CL. | | | |
| DENSITY LB./GAL. | | | |
| LEVEL | 394' | 394' | |
| MAX. REC. TEMP. — DEG. F. | 98° | 98° | |
| OPR. RIG TIME | 1 HOUR TOTAL TIME | | |
| RECORDED BY | WILSON | WILSON | |
| WITNESSED BY | TAIT | TAIT | |
| LOCATION | LAS VEGAS | LAS VEGAS | |

| RUN NO. | BORE HOLE RECORD BIT | FROM | TO | CASING RECORD SIZE | WGT. | FROM | TO |
|---|---|---|---|---|---|---|---|
| 1 | | | | 7" | | 0 | 62' |
| | 5-5/8" | 62' | 1200' | | | | |
| | 4-7/8" | 1200' | 2211' | | | | |
| | | | | | | | |
| | | | | | | | |

EQUIPMENT DATA

| | SURFACE 1 | SURFACE 2 | SUB-SURFACE 1 | SUB-SURFACE 2 |
|---|---|---|---|---|
| RUN NO. | 1 | 2 | 1 | 2 |
| TX TRANSDUCER SIZE | | | 3-5/8" | 3-5/8" |
| ISOLATOR LENGTH | | | 27-3/4" | 57" |
| CENTER TO CENTER | | | 37-3/4" | 67" |
| BUMPER O.D. | | | | |
| BOREHOLE GAIN — /DB | | | 3RD | 3RD |
| CAMERA MODEL NO. | LLAD | LLAD | | |
| SWEEP DELAY — μSEC. | 0 | 100 | | |
| TOTAL SWEEP TIME — μSEC. | 2000 | 2000 | | |
| LOGGING SPEED FT./MIN. | | | | |
| DEPTH SCALE FT./MARK | | | | |
| TIMING LINES | 100 | 100 | | |

CEMENTING DATA

| | PRIMARY | SQUEEZE |
|---|---|---|
| DATE | | |
| TYPE CEMENT | | |
| AMOUNT | | |
| ADDITIVES BY % | | |

GENERAL

| | |
|---|---|
| HOIST TRUCK NO. | 2694 |
| INST. TRUCK NO. | 2694 |
| STATION | LAS VEGAS |

WELL DATA

| | |
|---|---|
| TYPE WELL | |
| COMPLETION DATE | |
| WELL DRILLED WITH | ROTARY ☒ CABLE T. ☐ |

REMARKS

MICROSECONDS INCREASING ⟶

3' SPACING

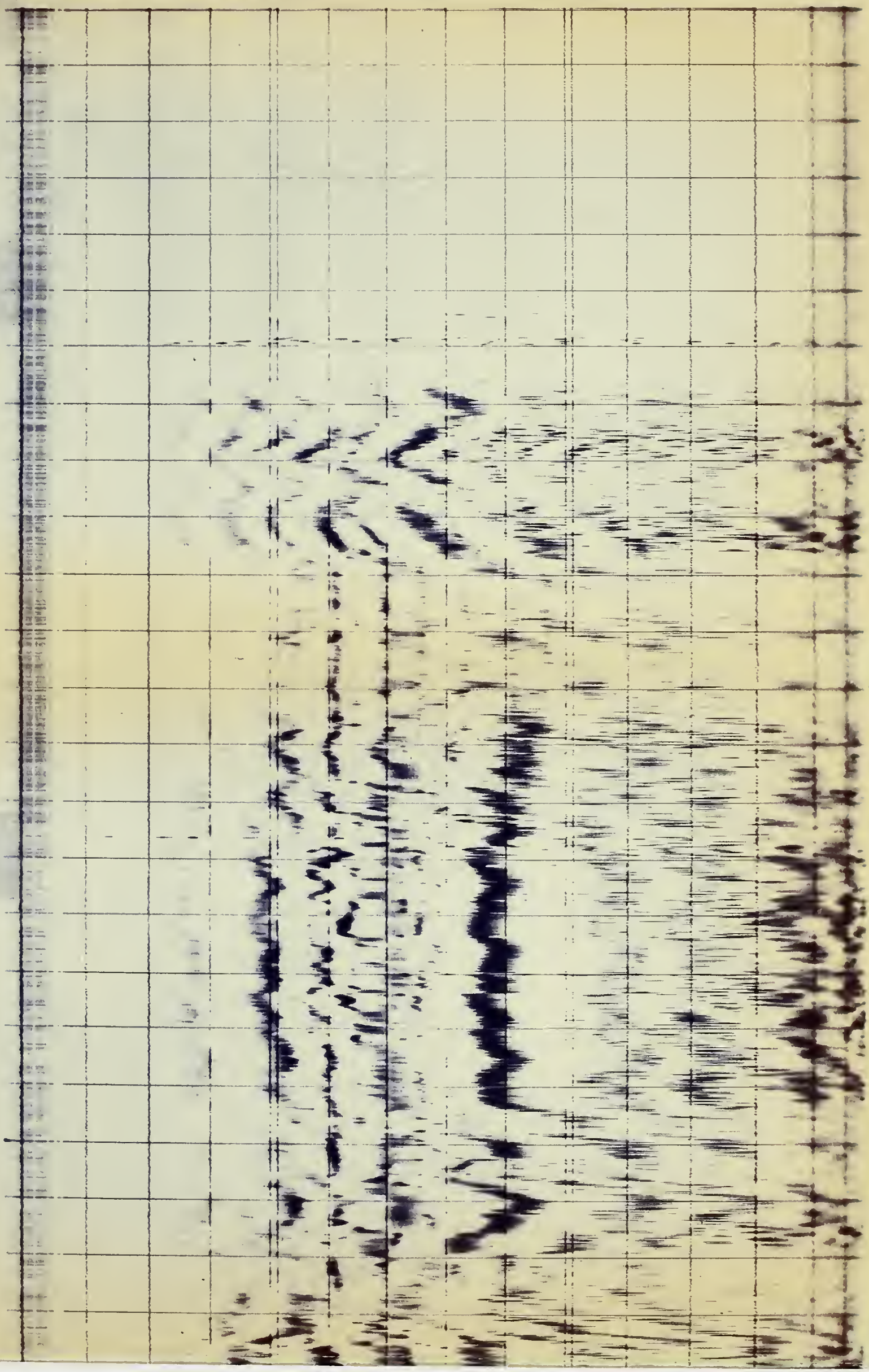
1000

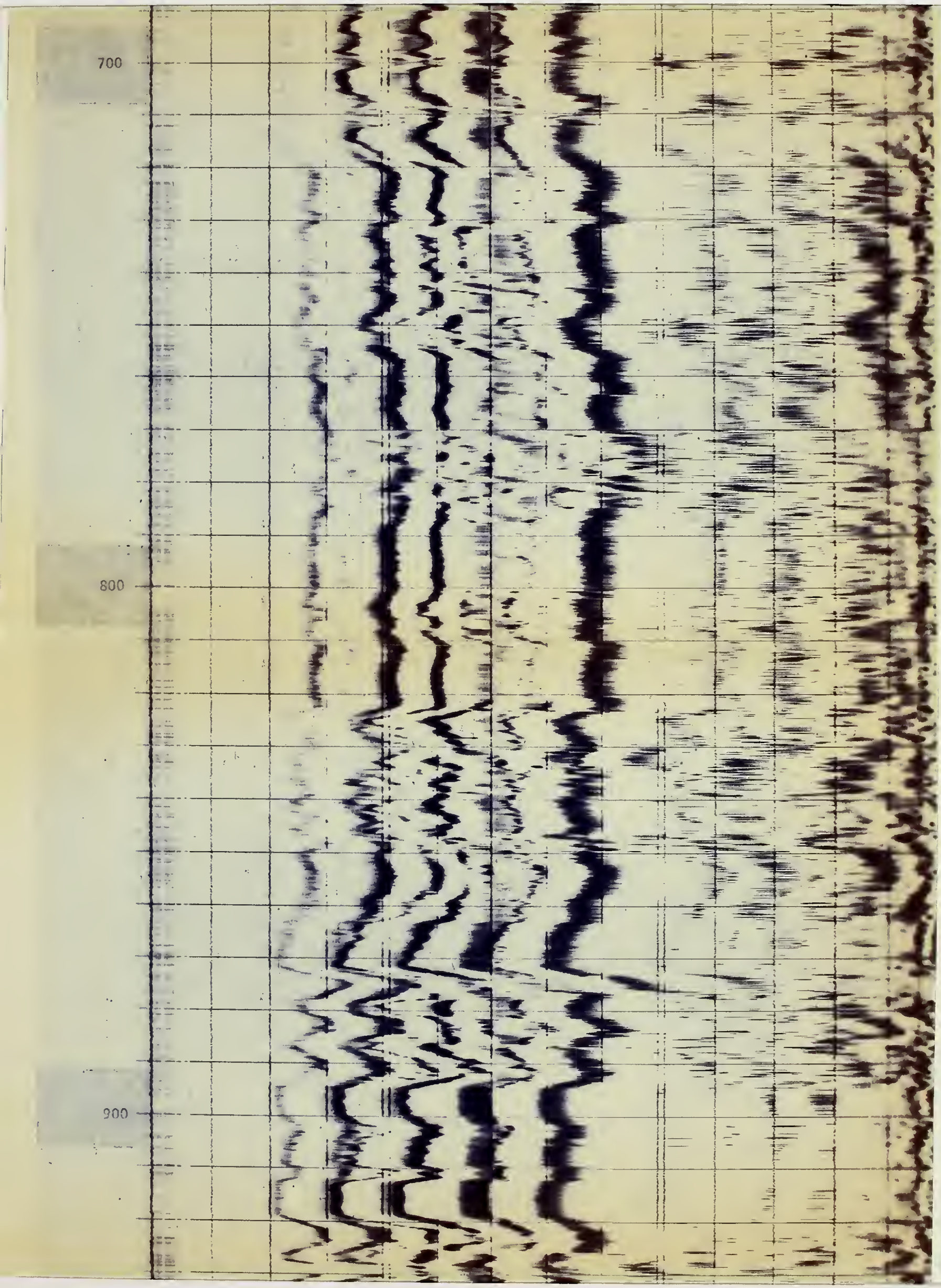
RUN # 1

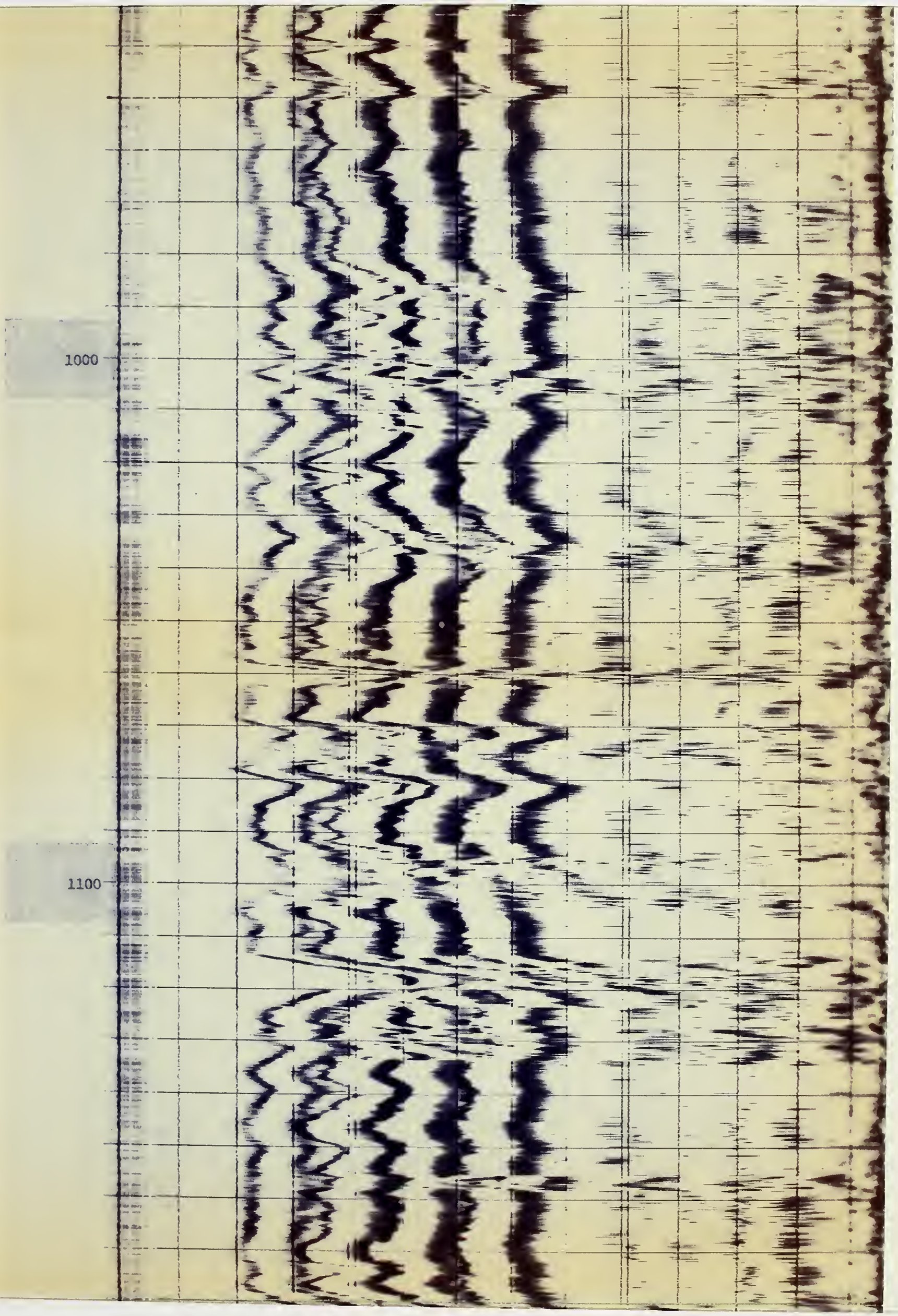
500

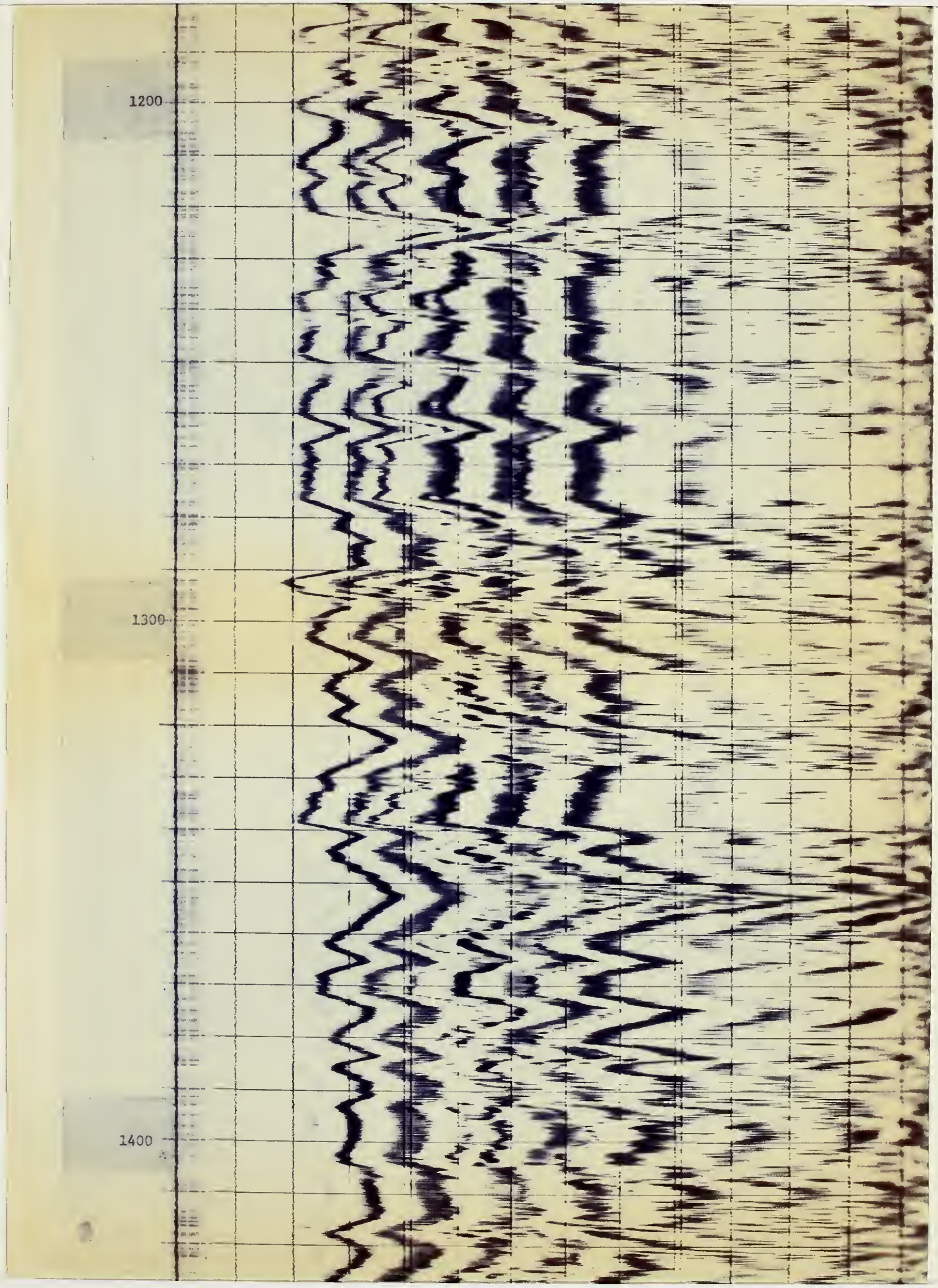
DEPTH

SSC-636-1-A


450
500
600

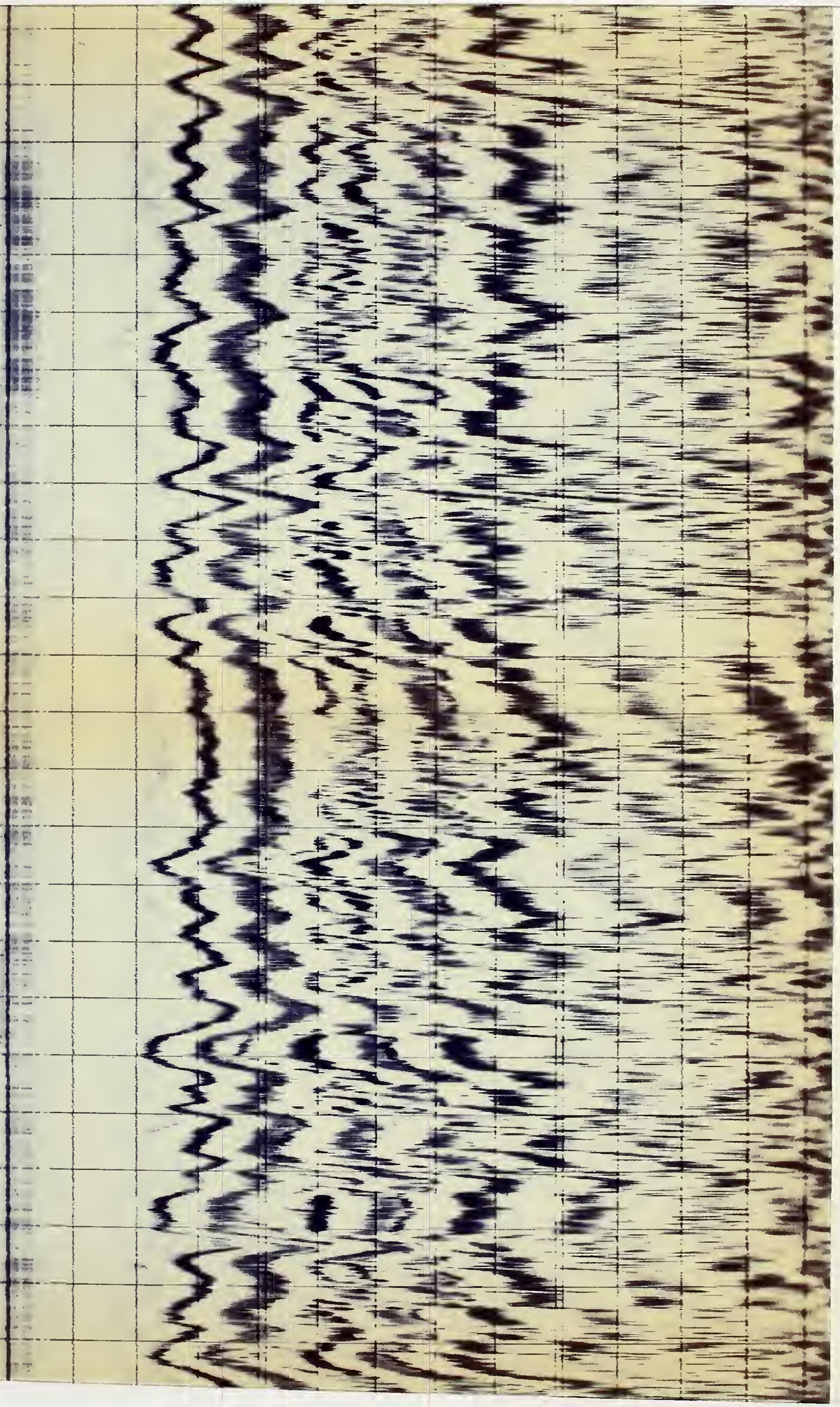

700
800
900

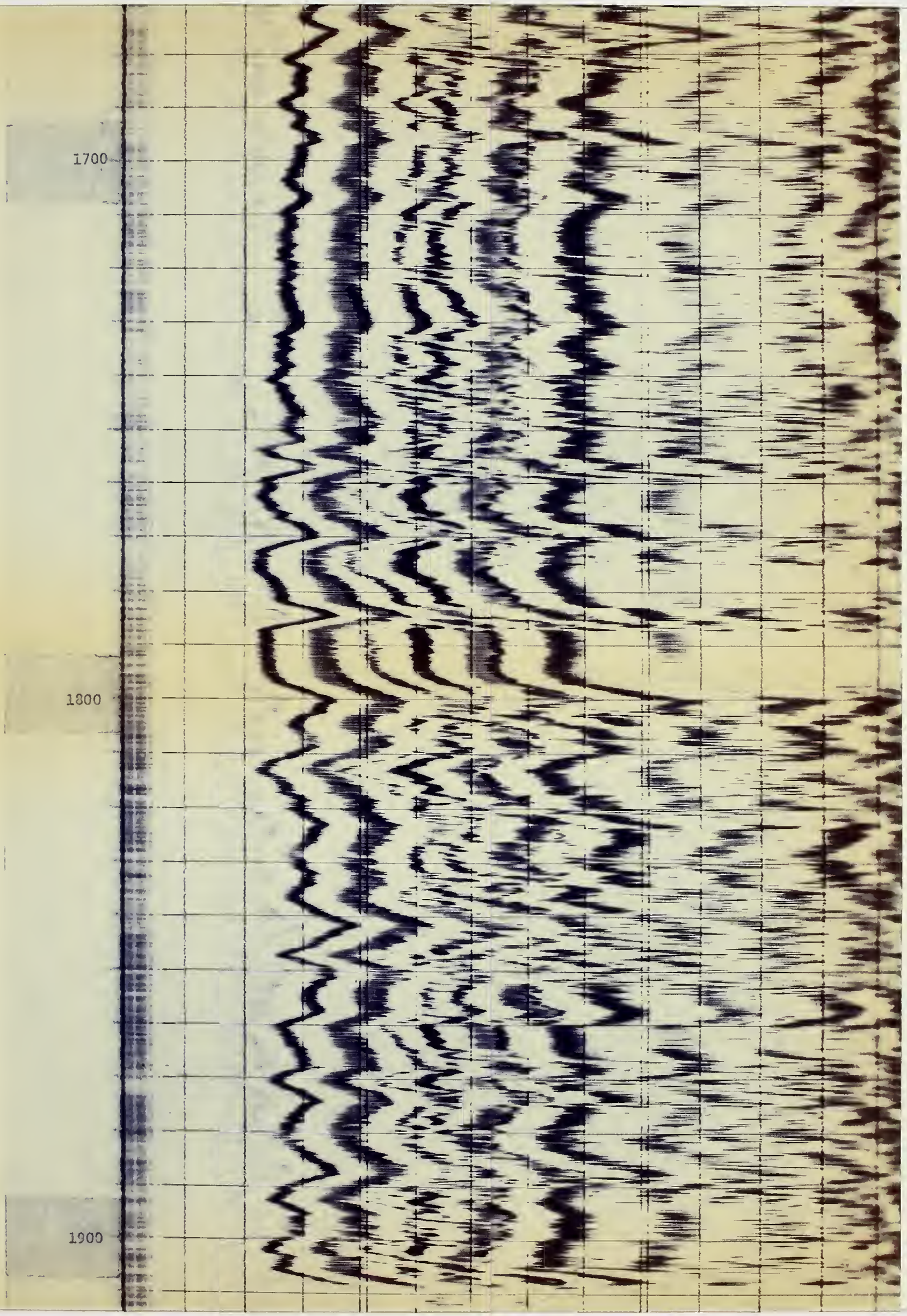

1000
1100

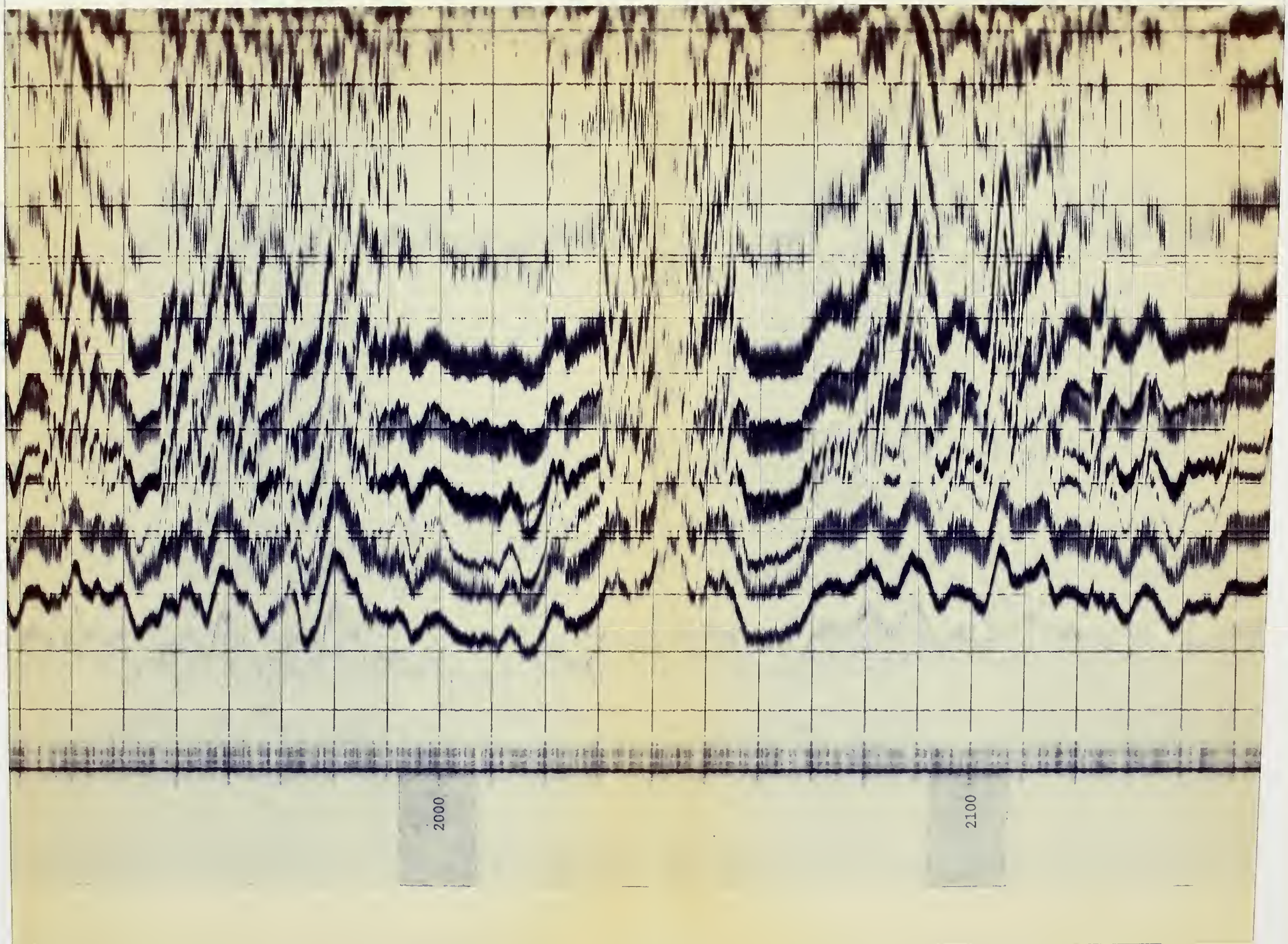

1200
1300
1400

1500

1600




1700
1800
1900


2000
2100

2200

T.D.
2206'

6' SPACING

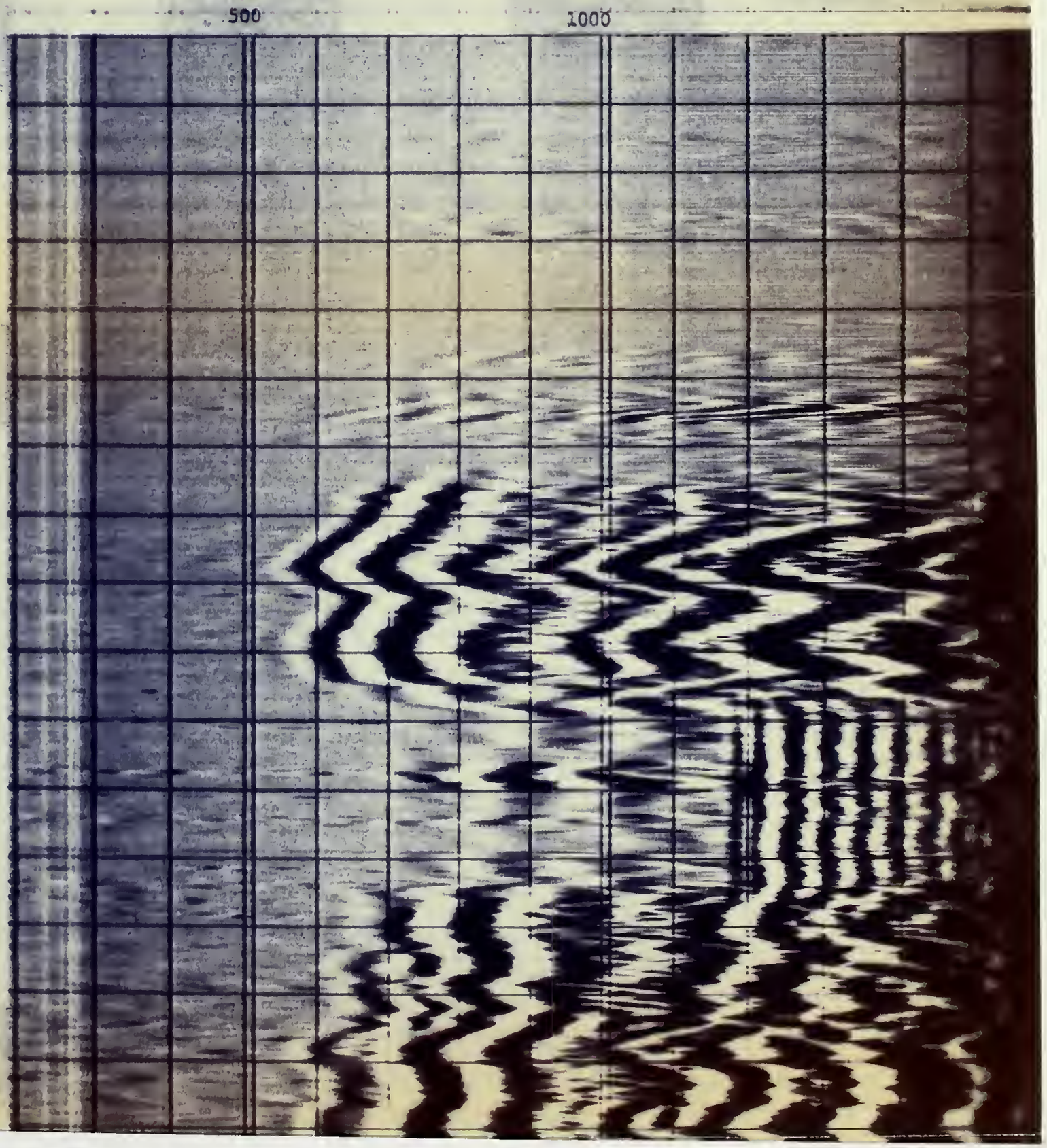
450

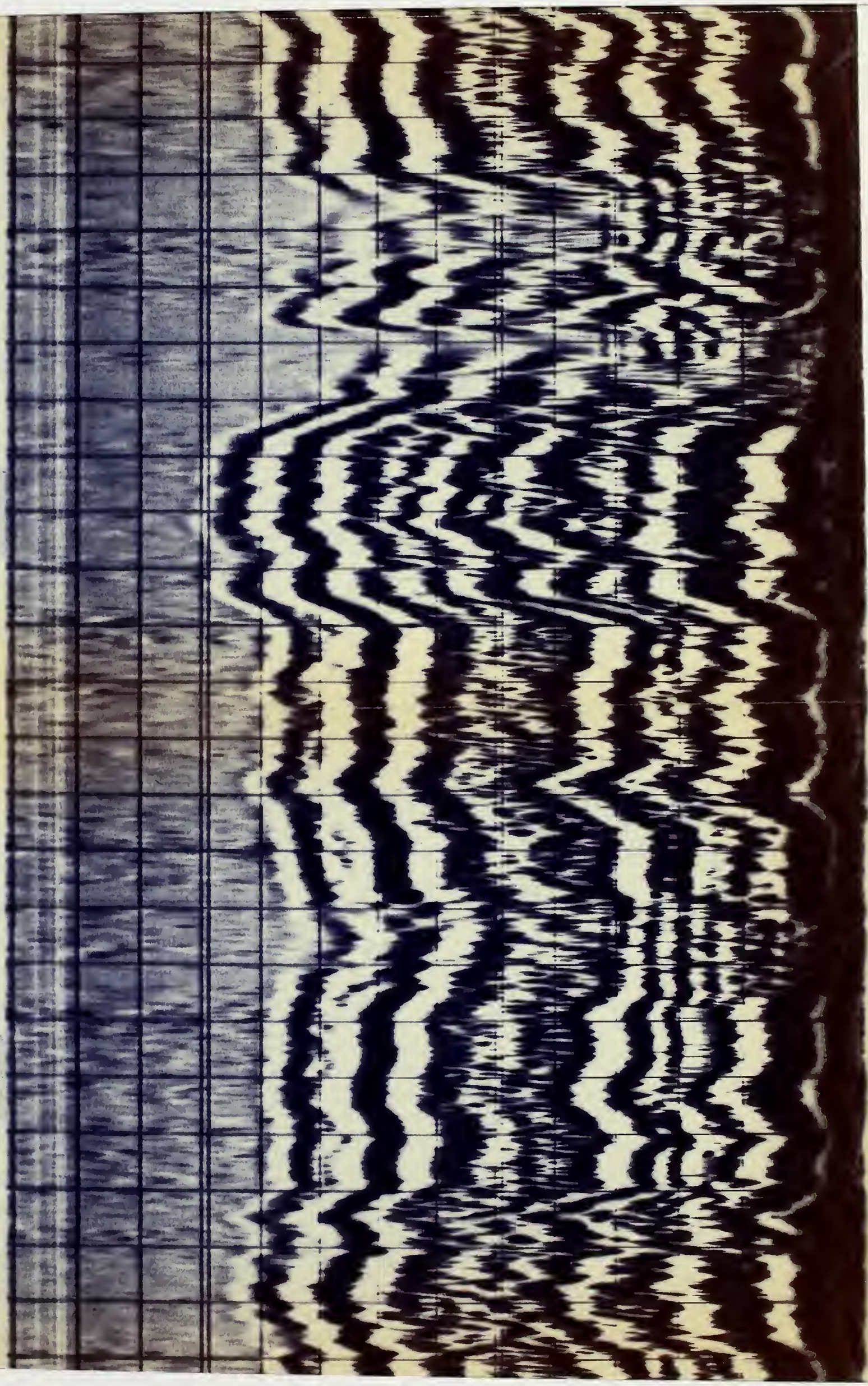
500

1000

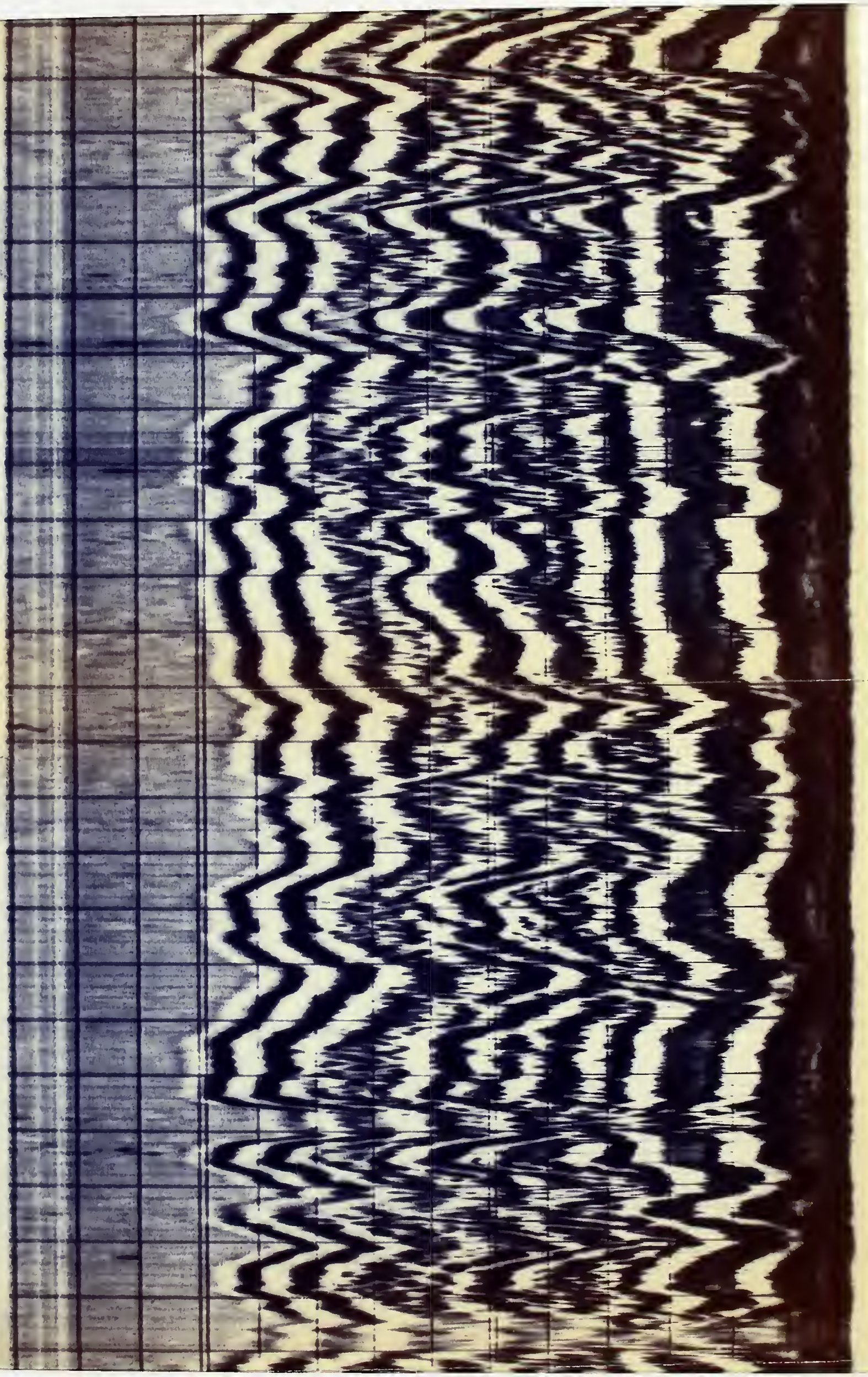
500

600



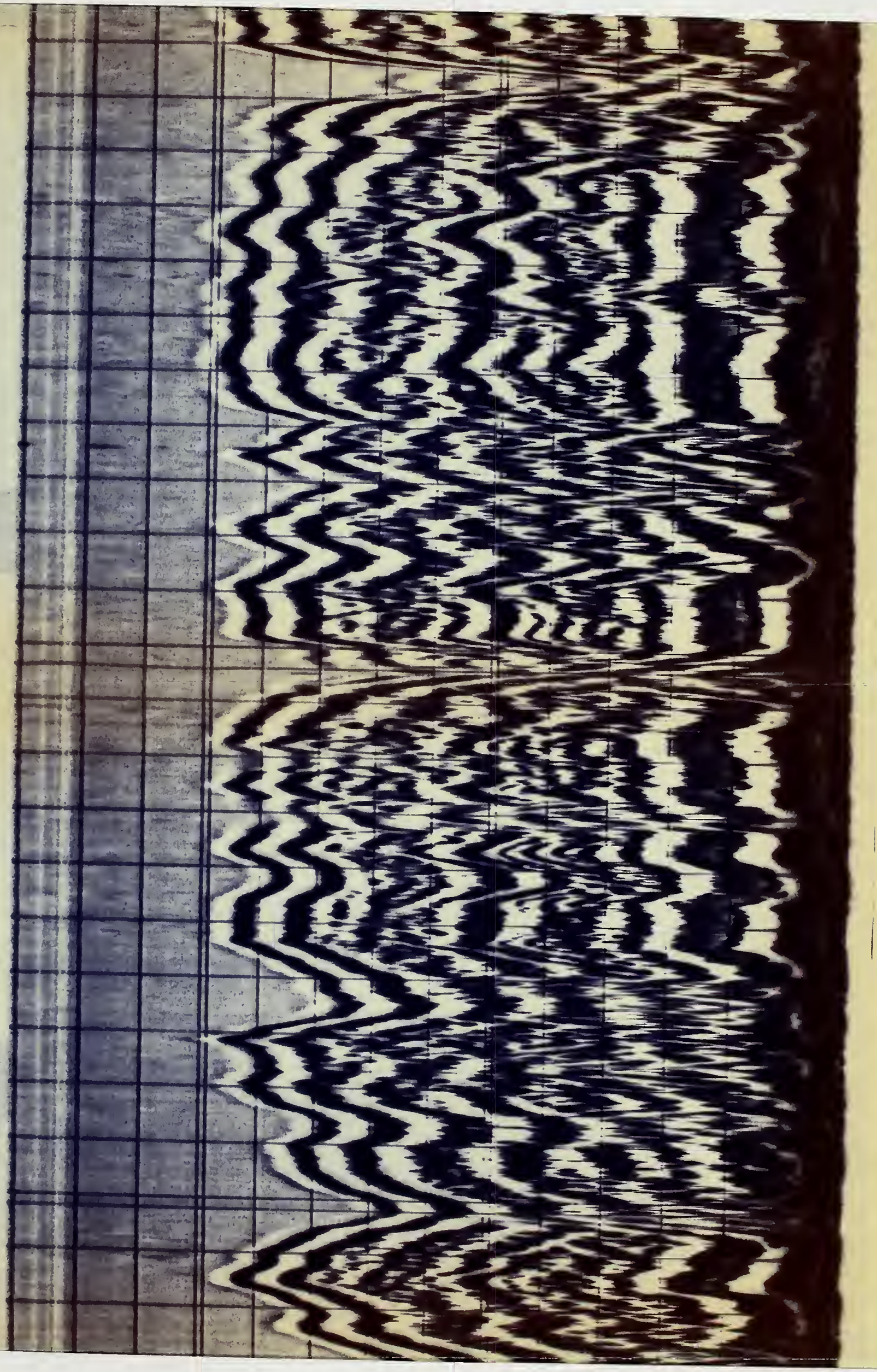

700
800

900



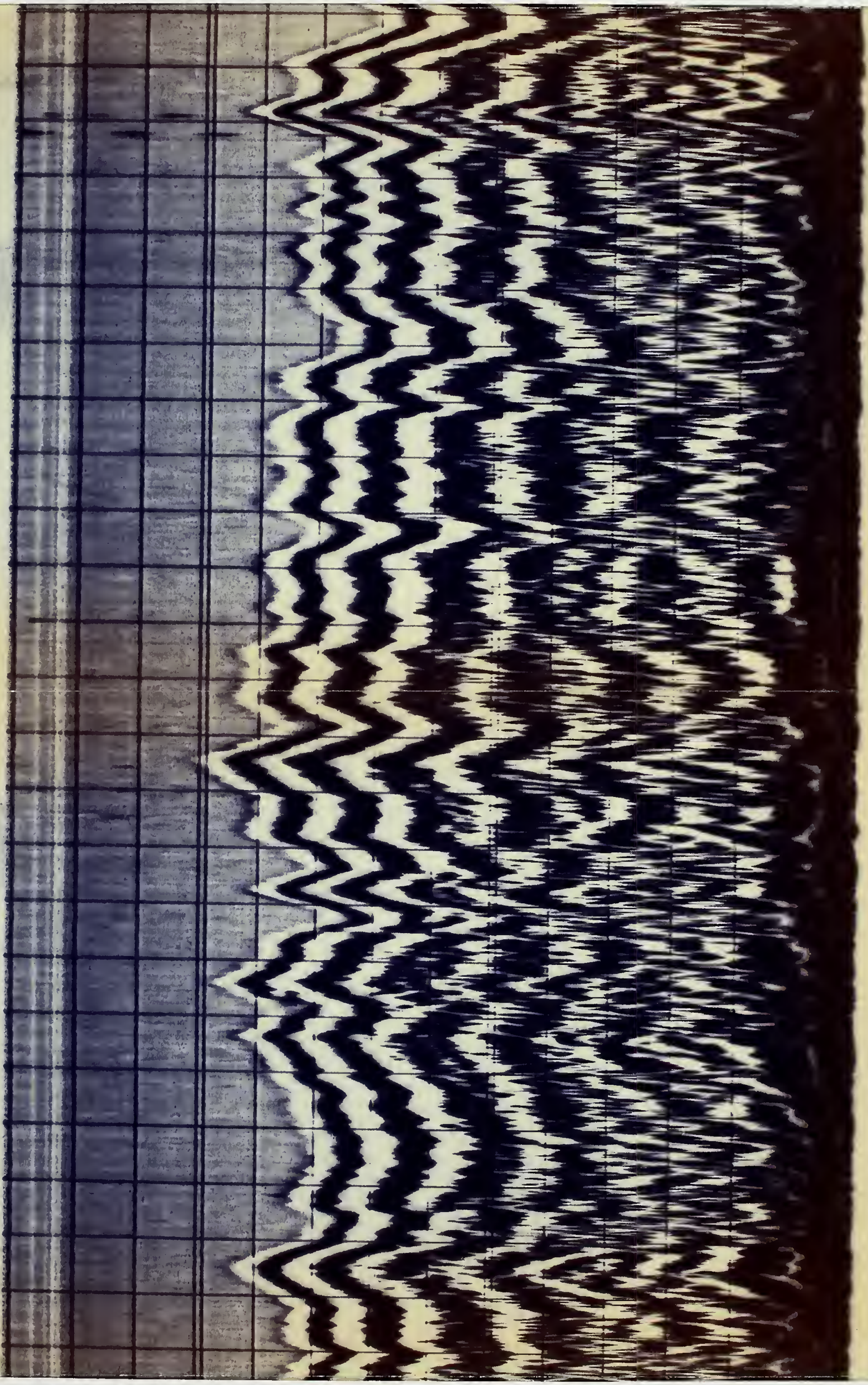
1000

1100


1200
1300

1400

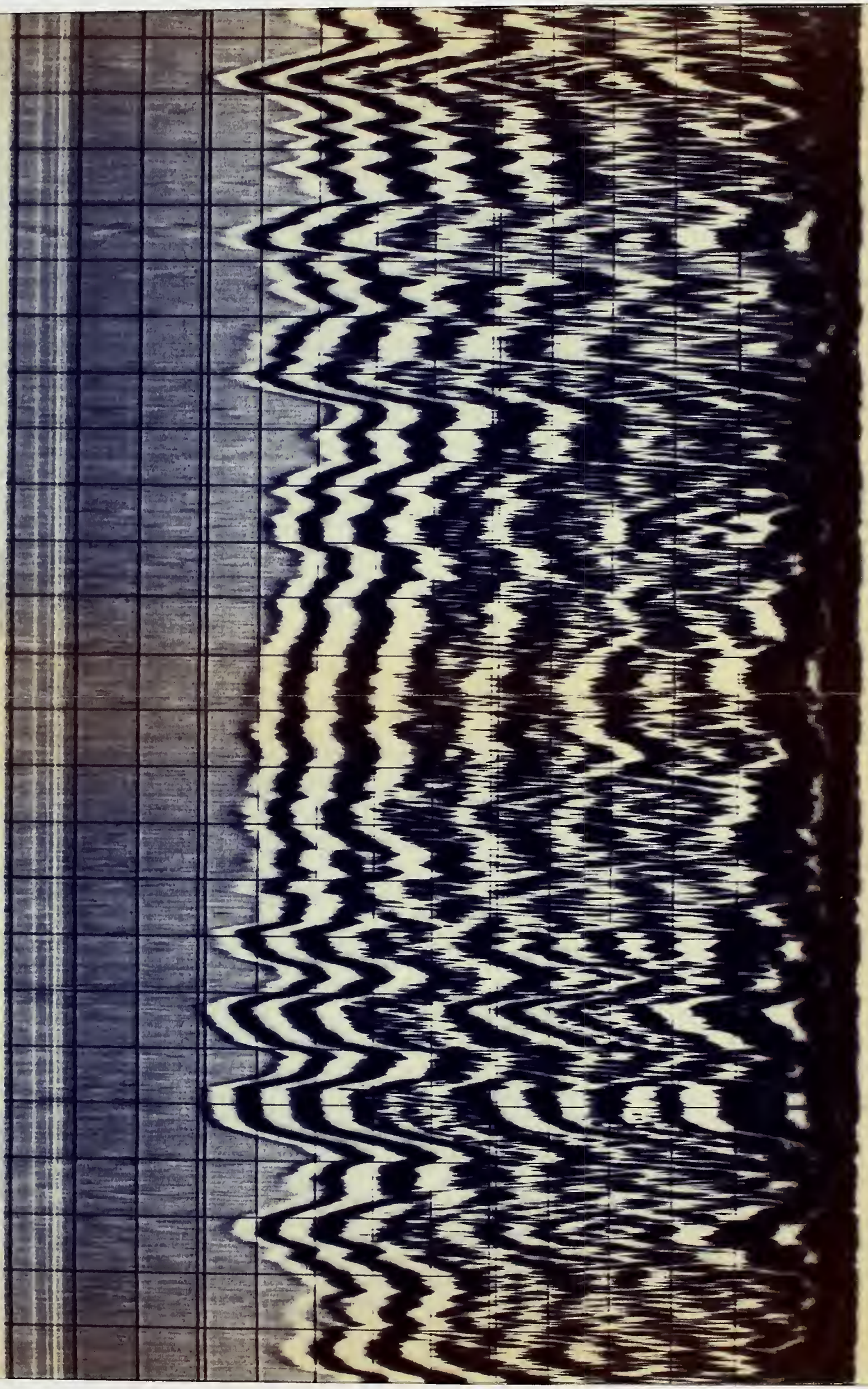
1500



1600

1700

1800



1900
2000
2100
2200
T.D.
2206'

# Birdwell

## Density Log

**COMPANY** ATLANTIC RICHFIELD COMPANY, ET. AL.

**WELL** SORGHUM GULCH #H-10

**FIELD**

**COUNTY** RIO BLANCO **STATE** COLORADO

**LOCATION:**

97' FNL & 184' FEL

**OTHER SERVICES**

V3D CAL TL
GR/ENP ES

**SEC.** 13 **TWP.** 3S **RGE.** 97W

**PERMANENT DATUM** GROUND LEVEL, **ELEV.** 6950'
**LOG MEASURED FROM** GL, ft. above perm. datum
**DRILLING MEASURED FROM** GL

**ELEVATIONS:**
**KB.**
**DF.**
**GL.** 6950'

| | | | |
|---|---|---|---|
| DATE | 29 JUNE 74 | | |
| RUN NO. | 1 | | |
| TYPE LOG | FDL | | |
| DEPTH – DRILLER | 2211 | | |
| DEPTH – LOGGER | 2206 | | |
| BOTTOM LOGGED INTERVAL | 2204 | | |
| TOP LOGGED INTERVAL | 60 | | |
| TYPE FLUID IN HOLE | WATER | | |
| SALINITY PPM CL. | 1 | | |
| DENSITY LB./GAL. | | | |
| LEVEL | 394 | | |
| MAX. REC. TEMP. – DEG. F | 98° | | |
| OPERATING RIG TIME | 2 HRS. | | |
| RECORDED BY | WILSON | | |
| WITNESSED BY | TAIT | | |
| LOCATION | LAS VEGAS | | |

| RUN NO. | BORE HOLE RECORD BIT | FROM | TO | CASING RECORD SIZE | WGT. | FROM | TO |
|---|---|---|---|---|---|---|---|
| 1 | | | | 7" | | 0 | 62' |
| | 5-5/8" | 62' | 1200' | | | | |
| | 4-7/8" | 1200' | 2211' | | | | |

95C-647-C

**GAMMA-GAMMA EQUIPMENT DATA**

| | |
|---|---|
| RUN NO. | 1 |
| TOOL MODEL NO. | LAHD |
| TOOL SERIAL NO. | W-11 |
| DIAMETER | 3-5/8" |
| SUB | PB |
| DETECT. MODEL NO. | 9371 TN |
| TOOL SPACING | 19" |
| SOURCE NO. | V-476 |
| DIRECT ZERO LOC. | |
| DISTANCE D OR D' | 13" |
| NOMINAL HOLE DIAM. | 5" |
| TRUCK NO. | 2694 |

**GAMMA-GAMMA LOGGING DATA**

| RUN NO. | DEPTHS FROM | DEPTHS TO | SPEED FT./MIN. | TC SEC. | CPM FULL SCALE | DIRECT CPM/DIV. | LINEAR GMS./DIV. |
|---|---|---|---|---|---|---|---|
| 1 | 2204' | 60' | 20 | 3 | 10X10⁴ | | .05 |

| | PRIMARY REFERENCE | SECONDARY REF. | KCPM BEFORE LOG | KCPM AFTER LOG | RECORDER CAL. REF. |
|---|---|---|---|---|---|
| | A-14 | | | | 25K |
| EQUIVALENT DEN. G/CC | 2.598 | | | | 2.34 |
| | M-107 | | | | 50K |
| EQUIVALENT DEN. G/CC | 1.742 | | | | 2.6 |

GRAIN DENSITY GMS/CC:
FLUID DENSITY GMS/CC:

NA: INFORMATION NOT AVAILABLE

REMARKS: THIS WORK WAS PERFORMED UNDER UNITED STATES ATOMIC ENERGY COMMISSION BY-PRODUCT MATERIAL LICENSE NO. 35-5651-1

NOTE: RECORDED BULK DENSITY MUST BE CORRECTED FOR STANDOFF (PROXIMITY INDEX)

PROXIMITY INDEX
INCHES 0 1

BULK DENSITY
GRAMS/CC
2.0 2.5 3.0

DIRECT COUNT RATE KCPM

DEPTH

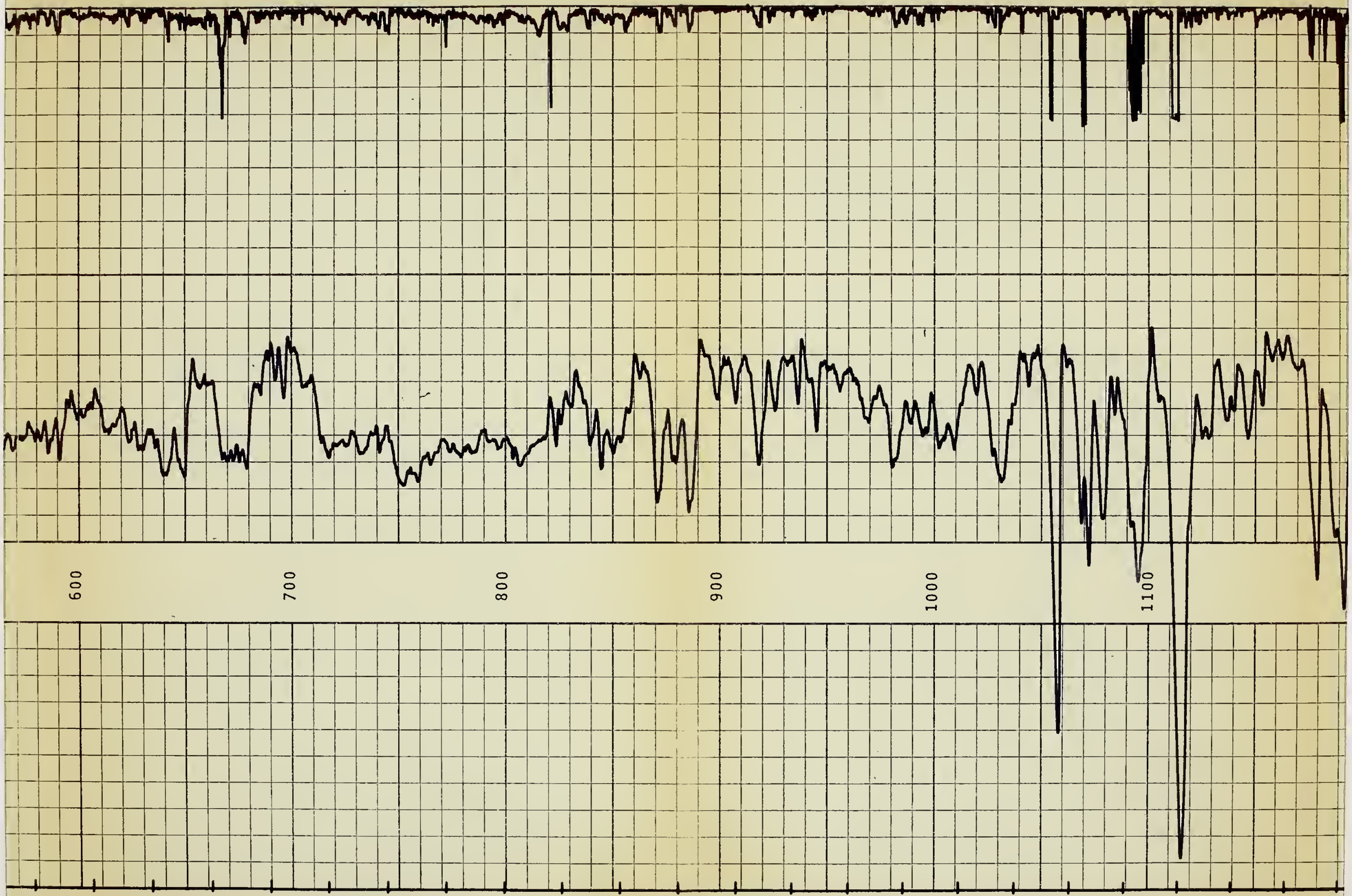
DIRECT COUNT RATE KCPM

FLUID LEVEL

50 100 200 300 400 500

BIDWELL DIV. S.S.C.

CHART NO. 2-1008




BIRDWELL DIV. S.S.C.

CHART NO. 2-100B

1200

1300

1400

1500

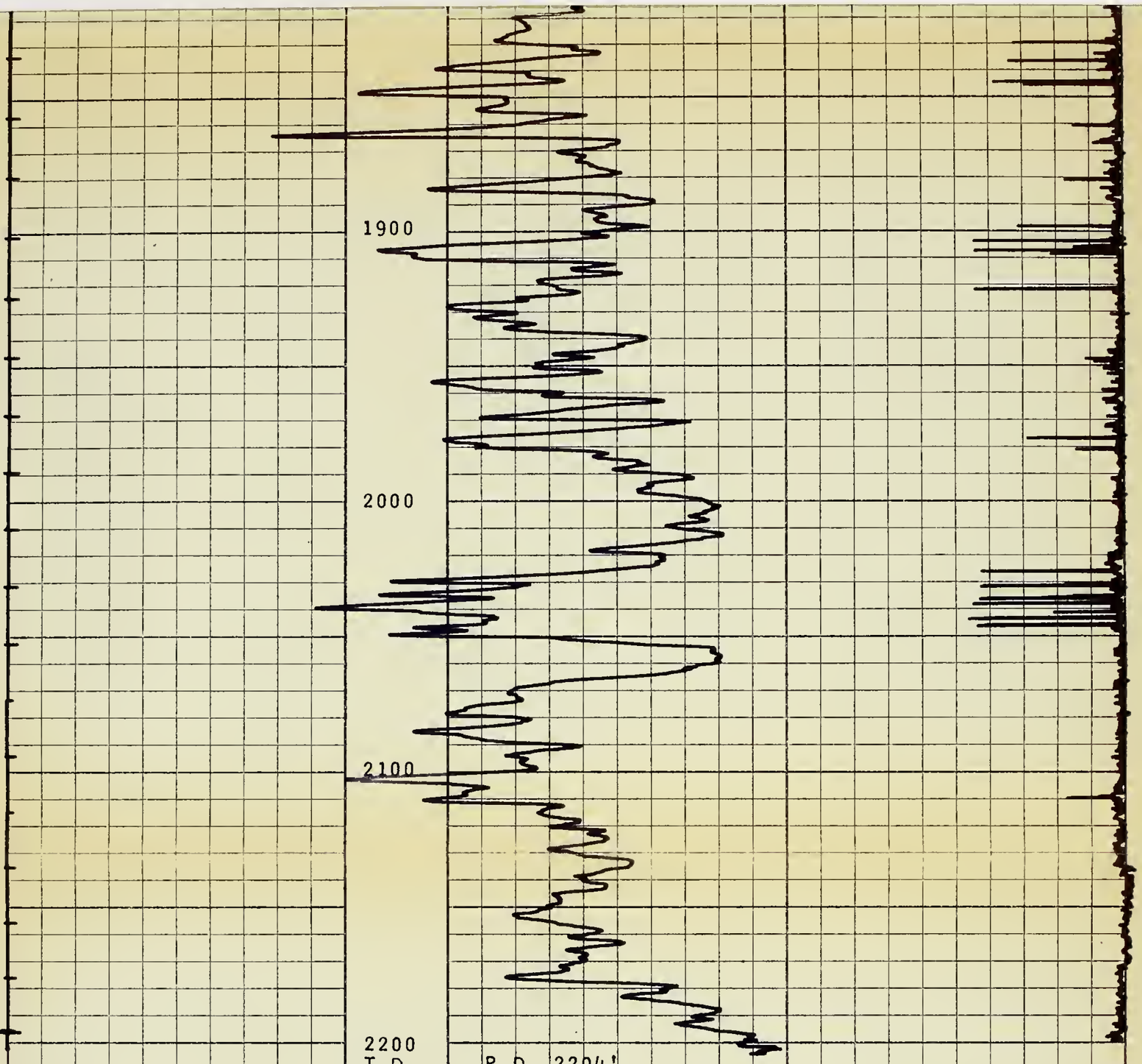
1600

1700

1800

BIRDWELL DIV. S.S.C.

CHART NO. 2-100B




CALIBRATION DATA

P1

BIRDWELL DIV. SES
CHART NO. 2-100B
PRINTED IN U.S.A.

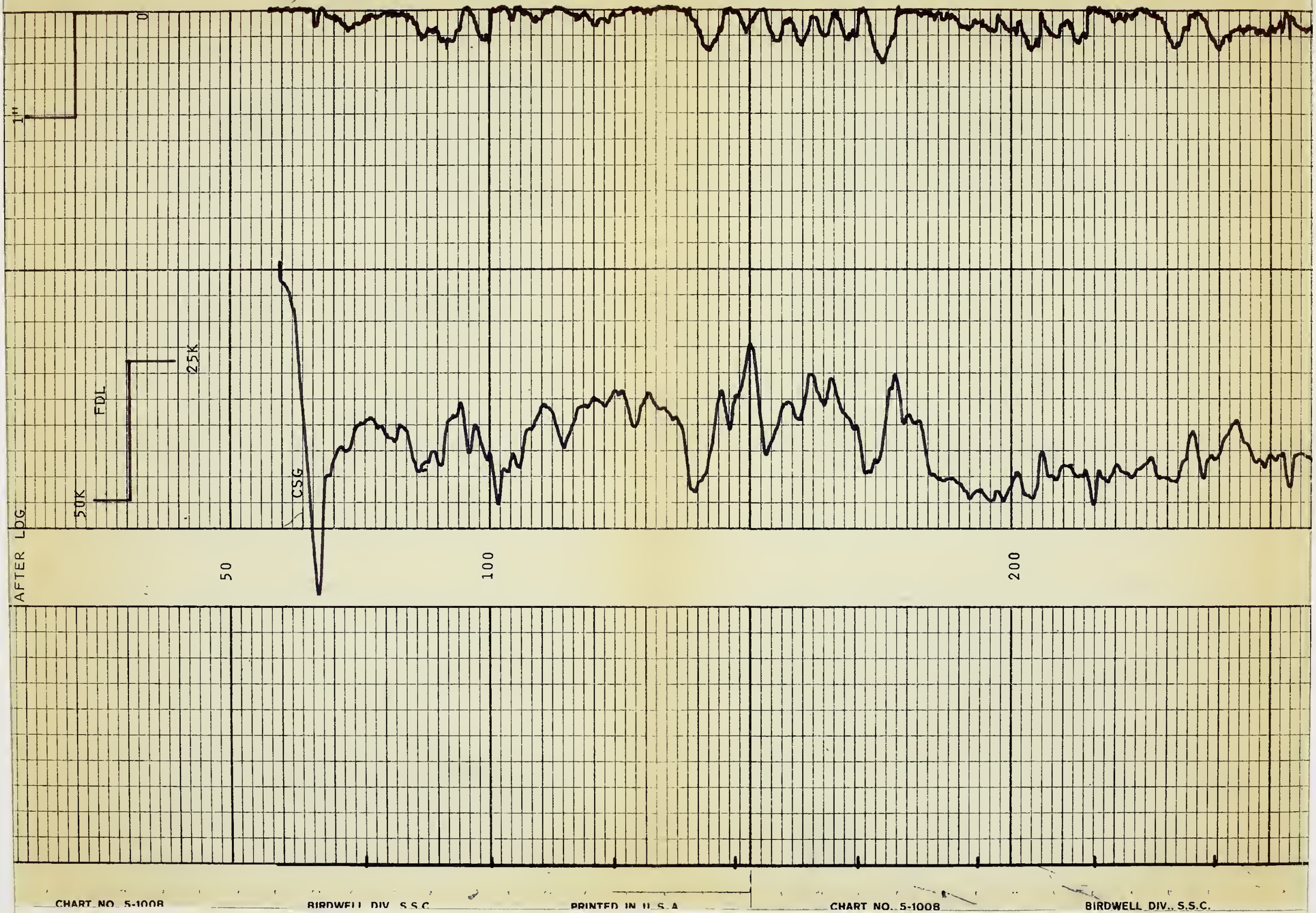
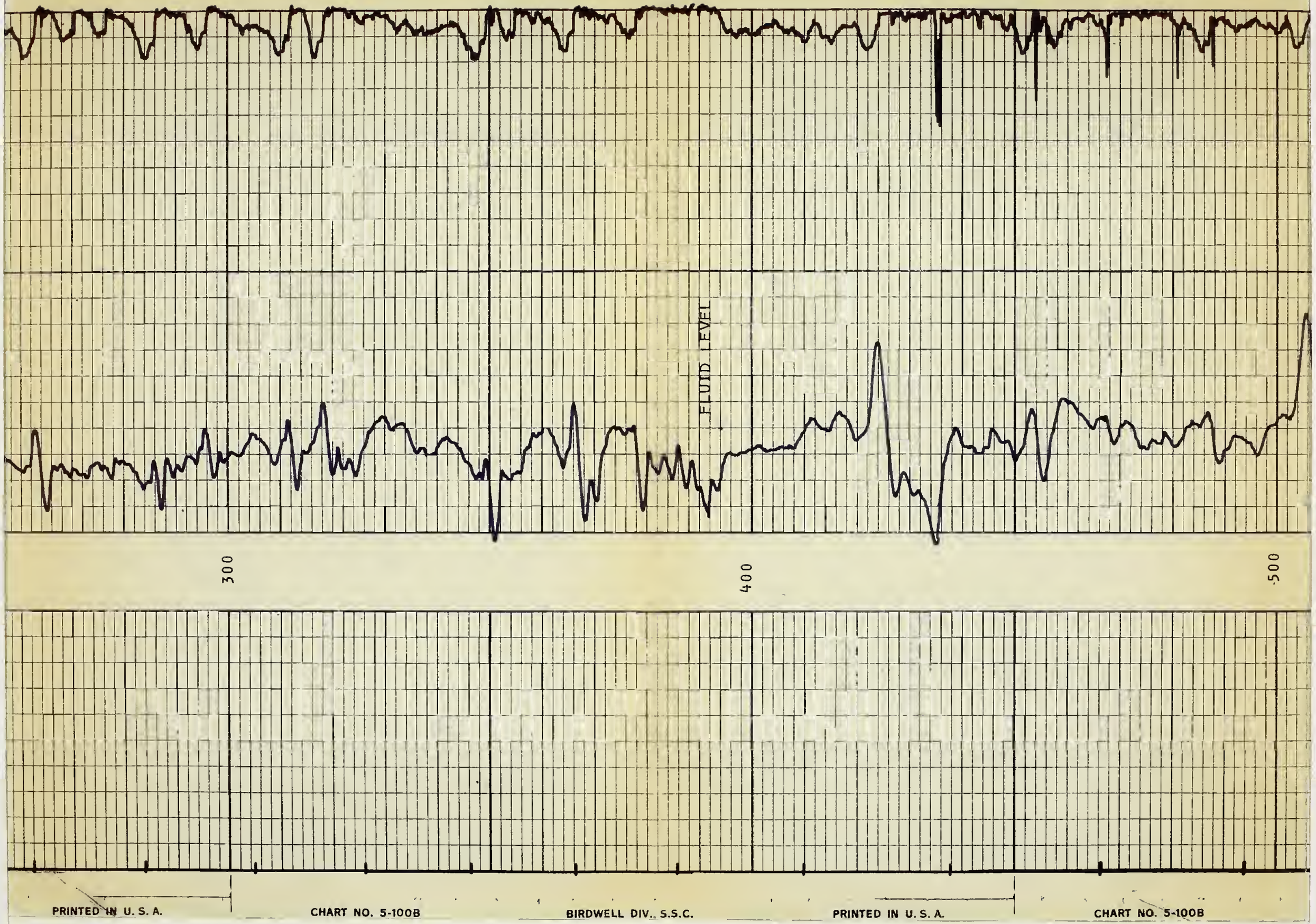



CHART NO. 5-1008 BIRDWELL DIV. S.S.C. PRINTED IN U.S.A.

CHART NO. 5-1008 BIRDWELL DIV., S.S.C.




PRINTED IN U. S. A. CHART NO. 5-100B BIRDWELL DIV., S.S.C. PRINTED IN U. S. A. CHART NO. 5-100B

600

700

BIRDWELL DIV., S.S.C. PRINTED IN U. S. A. CHART NO. 5-100B BIRDWELL DIV., S.S.C. PRINTED IN U. S. A.

800

900

1000

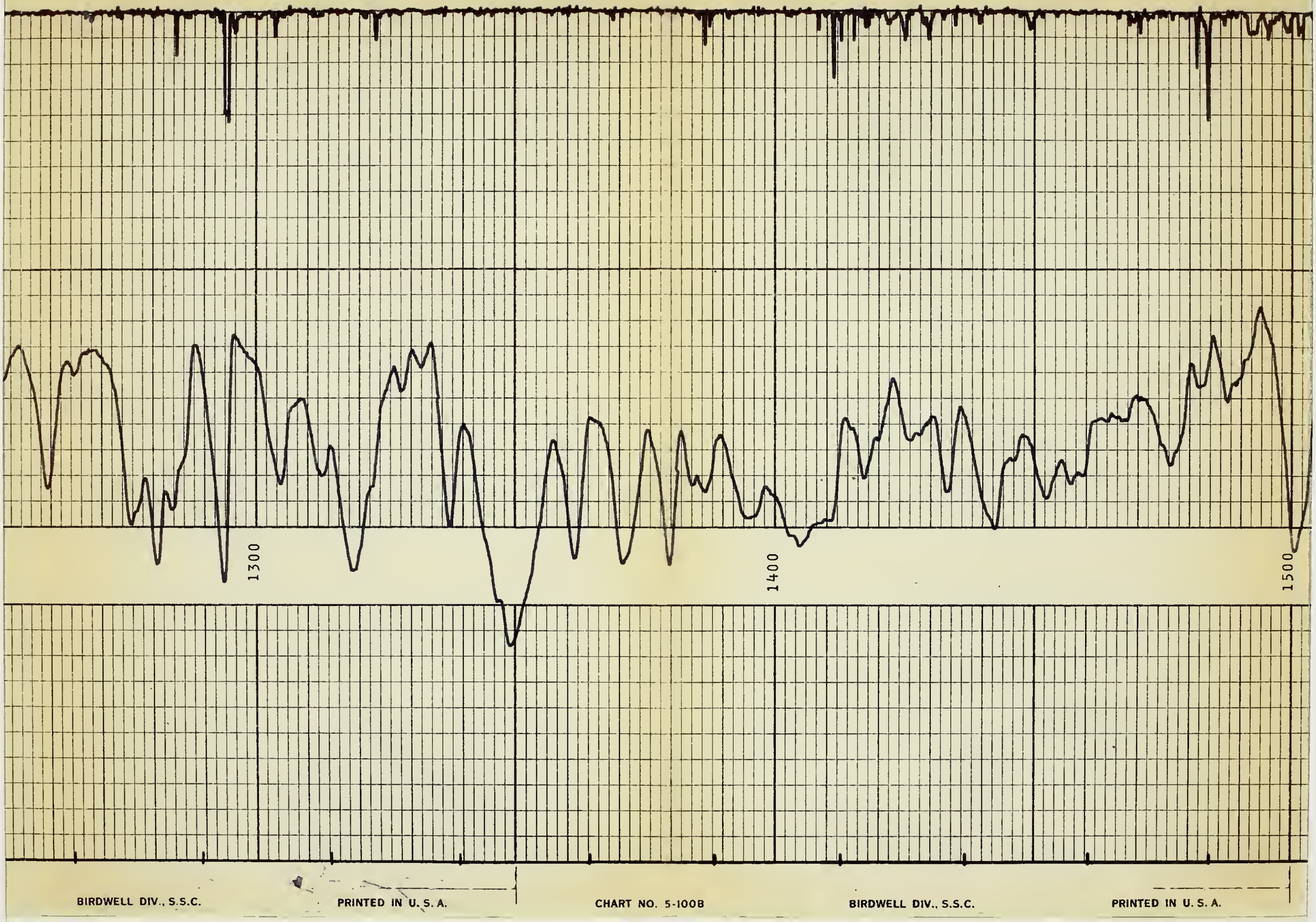
CHART NO. 5-100B BIRDWELL DIV., S.S.C. PRINTED IN U. S. A.

CHART NO. 5-100B BIRDWELL DIV., S.S.C.

1100

1200

PRINTED IN U. S. A. CHART NO. S-100B BIRDWELL DIV., S.S.C. PRINTED IN U. S. A. CHART NO. S-100B




BIRDWELL DIV., S.S.C. PRINTED IN U. S. A. CHART NO. 5-100B BIRDWELL DIV., S.S.C. PRINTED IN U. S. A.

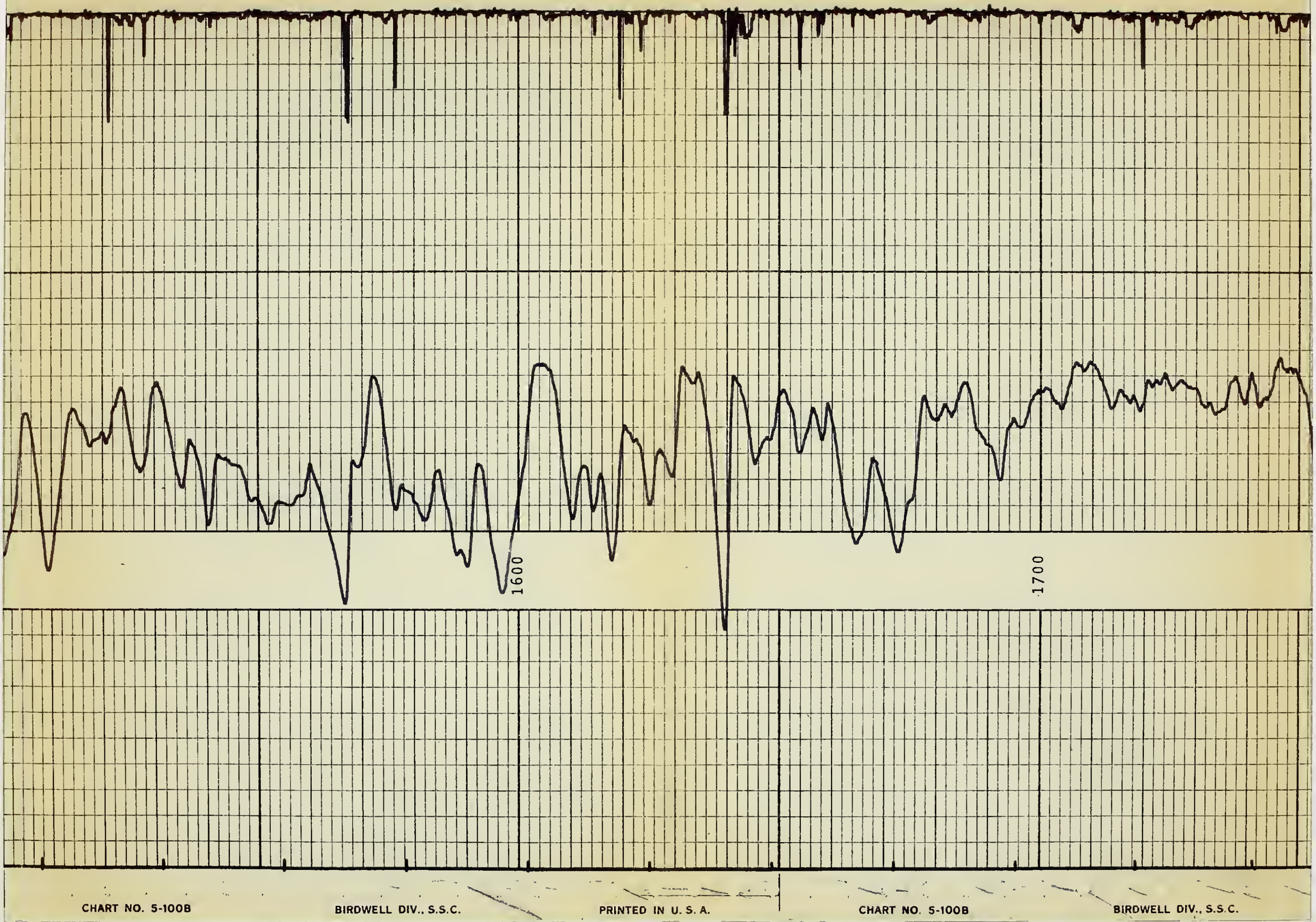



CHART NO. 5-100B BIRDWELL DIV., S.S.C. PRINTED IN U. S. A.

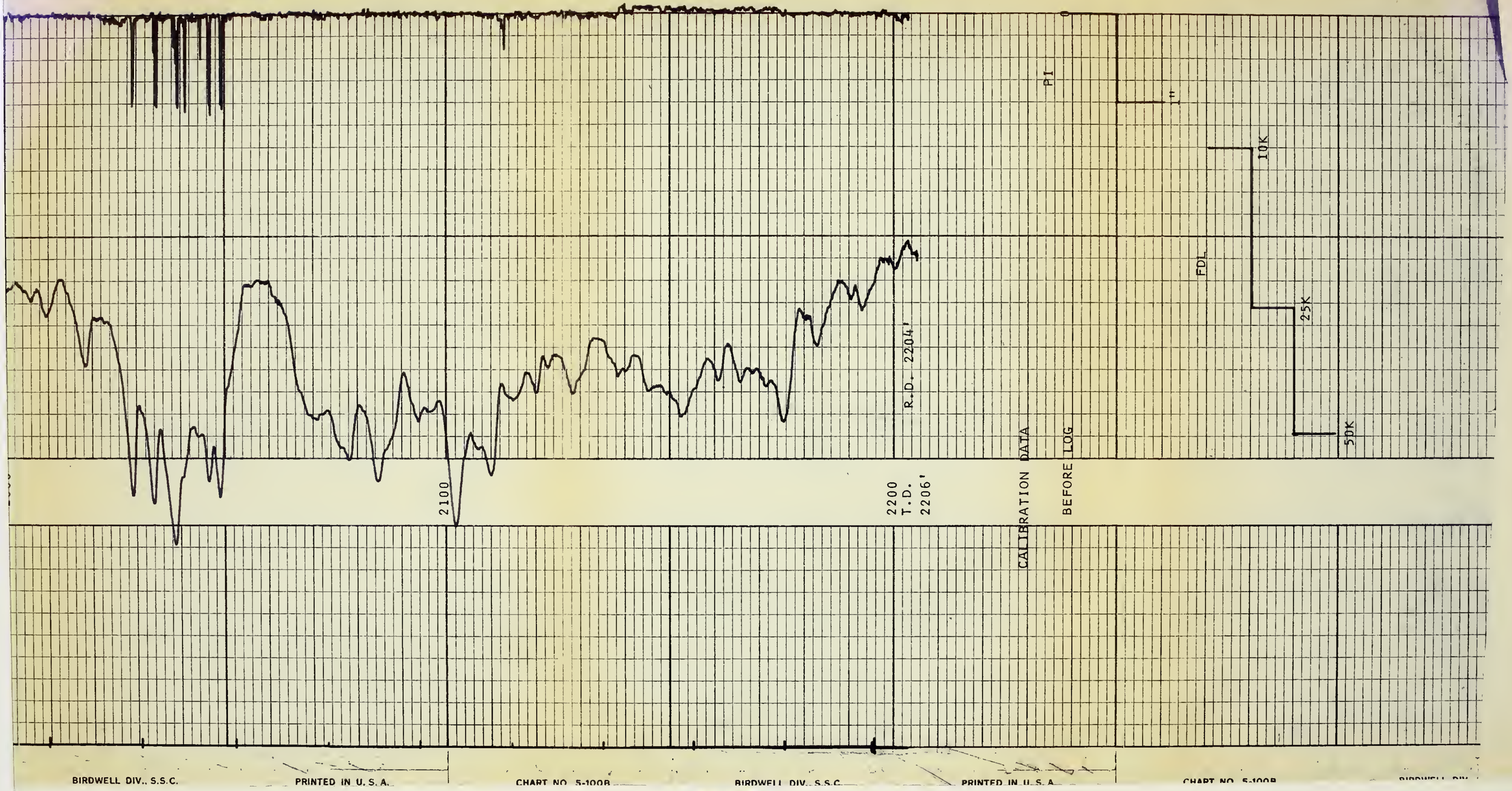
CHART NO. 5-100B BIRDWELL DIV., S.S.C.

1800

1900

2000

PRINTED IN U. S. A. CHART NO. 5-1008 BIRDWELL DIV., S.S.C. PRINTED IN U. S. A. CHART NO. 5-1008




BIRDWELL DIV., S.S.C. PRINTED IN U. S. A. CHART NO. 5-100B BIRDWELL DIV., S.S.C. PRINTED IN U. S. A. CHART NO. 5-100B

# Birdwell

## Nuclear Log

**COMPANY** ATLANTIC RICHFIELD COMPANY, ET. AL.

**WELL** SORGHUM GULCH #H-10

**FIELD**

**COUNTY** RIO BLANCO **STATE** COLORADO

**LOCATION:**

97' FNL & 184' FEL

**OTHER SERVICES**

CAL FDL V3D
TL ES

SEC. 13 TWP. 3S RGE. 97W

**ELEVATIONS:**

KB.
DF.
GL. 6950'

PERMANENT DATUM GROUND LEVEL, ELEV. 6950'
LOG MEASURED FROM GL, ft. above perm. datum
DRILLING MEASURED FROM GL

| | | | |
|---|---|---|---|
| DATE | 29 JUNE 74 | | |
| RUN NO. | | 1 | |
| TYPE LOG | GR | ENP | |
| DEPTH – DRILLER | 2211 | 2211 | |
| DEPTH – LOGGER | 2206 | 2206 | |
| BOTTOM LOGGED INTERVAL | 2195 | 2206 | |
| TOP LOGGED INTERVAL | 20 | 20 | |
| TYPE FLUID IN HOLE | WATER | WATER | |
| SALINITY PPM CL. | | 1 | |
| DENSITY LB./GAL. | | | |
| LEVEL | 394 | 394 | |
| MAX. REC. TEMP. – DEG. F | 98° | 98° | |
| OPERATING RIG TIME | 2 HOURS TOTAL TIME | | |
| RECORDED BY | WILSON | WILSON | |
| WITNESSED BY | TAIT | TAIT | |
| LOCATION | LAS VEGAS | LAS VEGAS | |

| RUN NO. | BORE HOLE RECORD BIT | FROM | TO | CASING RECORD SIZE | WGT. | FROM | TO |
|---|---|---|---|---|---|---|---|
| 1 | | | | 7" | | 0 | 62' |
| | 5-5/8" | 62' | 1200' | | | | |
| | 4-7/8" | 1200' | 2211' | | | | |
| | | | | | | | |
| | | | | | | | |

THIS HEADING AND LOG CONFORM TO API RP-33 ®

SSC-606-F

**EQUIPMENT DATA**

| | GAMMA RAY | NEUTRON |
|---|---|---|
| RUN NO. | 1 | 1 |
| TOOL MODEL NO. | LAAB | ENP |
| DIAMETER | 3-5/8" | LABB |
| DETECT. MODEL NO. | MG-70 HIT | 3-5/8" |
| TYPE | GM | 9373 TN |
| LENGTH | 12" | GM |
| DIST. TO N. SOURCE | 9' | 6" |
| SOURCE MODEL NO. | | MRC |
| SERIAL NO. | | 289 |
| SPACING | | 15.5" |
| TYPE | | PU:8BE |
| STRENGTH-N/SEC. | | |

**GENERAL**

| | |
|---|---|
| TRUCK NO. | 2694 |
| TOOL SERIAL NO. | |

**LOGGING DATA**

| | GAMMA RAY | | | | | NEUTRON | | | |
|---|---|---|---|---|---|---|---|---|---|
| RUN NO. | DEPTHS FROM | DEPTHS TO | SPEED FT/MIN | T.C. SEC. | CPM FULL SCALE | ZERO DIV. L OR R | API G.R. UNITS PER LOG DIV. | T.C. SEC. | CPM FULL SCALE | ZERO DIV. L OR R | N. UNITS PER LOG DIV. |
| 1 | 2195 | 20 | 20 | 3 | 20X10³ | 0 | 20 | 3 | 50X10³ | | 3%/DIV. |
| | 2204 | 20 | | | | | | | | | |

REFERENCE LITERATURE:

REMARKS: THIS WORK WAS PERFORMED UNDER UNITED STATES ATOMIC ENERGY COMMISSION BY-PRODUCT MATERIAL LICENSE NO. 35-05651-01 AND SPECIAL NUCLEAR MATERIALS LICENSE NO. SNM-161

GAMMA RAY | DEPTH

NEUTRON

NEUTRON

7-7/8" LIMESTONE

API GAMMA RAY UNITS

0 100 200

NEUTRON UNITS

45 30 15 0

0 100 200 300 400 500

CSG.

FLUID LEVEL

BIRDWELL DIV., S.S.C.

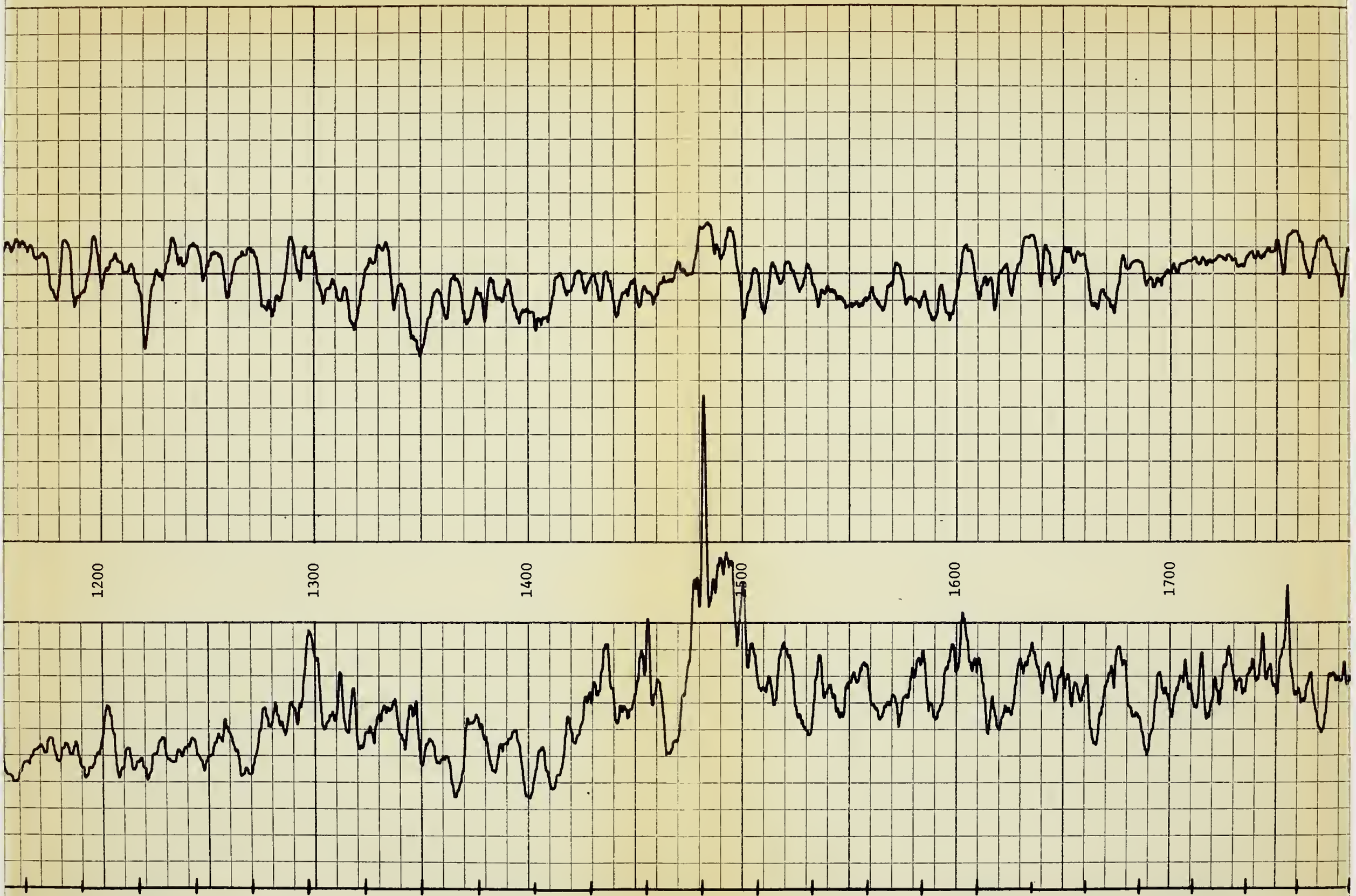
CHART NO. 2-10

600 700 800 900 1000 1100

2-1008

BIRDWELL DIV., S.S.C.

CHART NO. 2-1008




BIRDWELL DIV. S.S.C.

CHART NO. 2-1008

R.D. 2195'

R.D. 2204'

2200
T.D.
2206'

2100

2000

1900

1800

CALIBRATION DATA

AFTER LOG

0

GR

10K

0

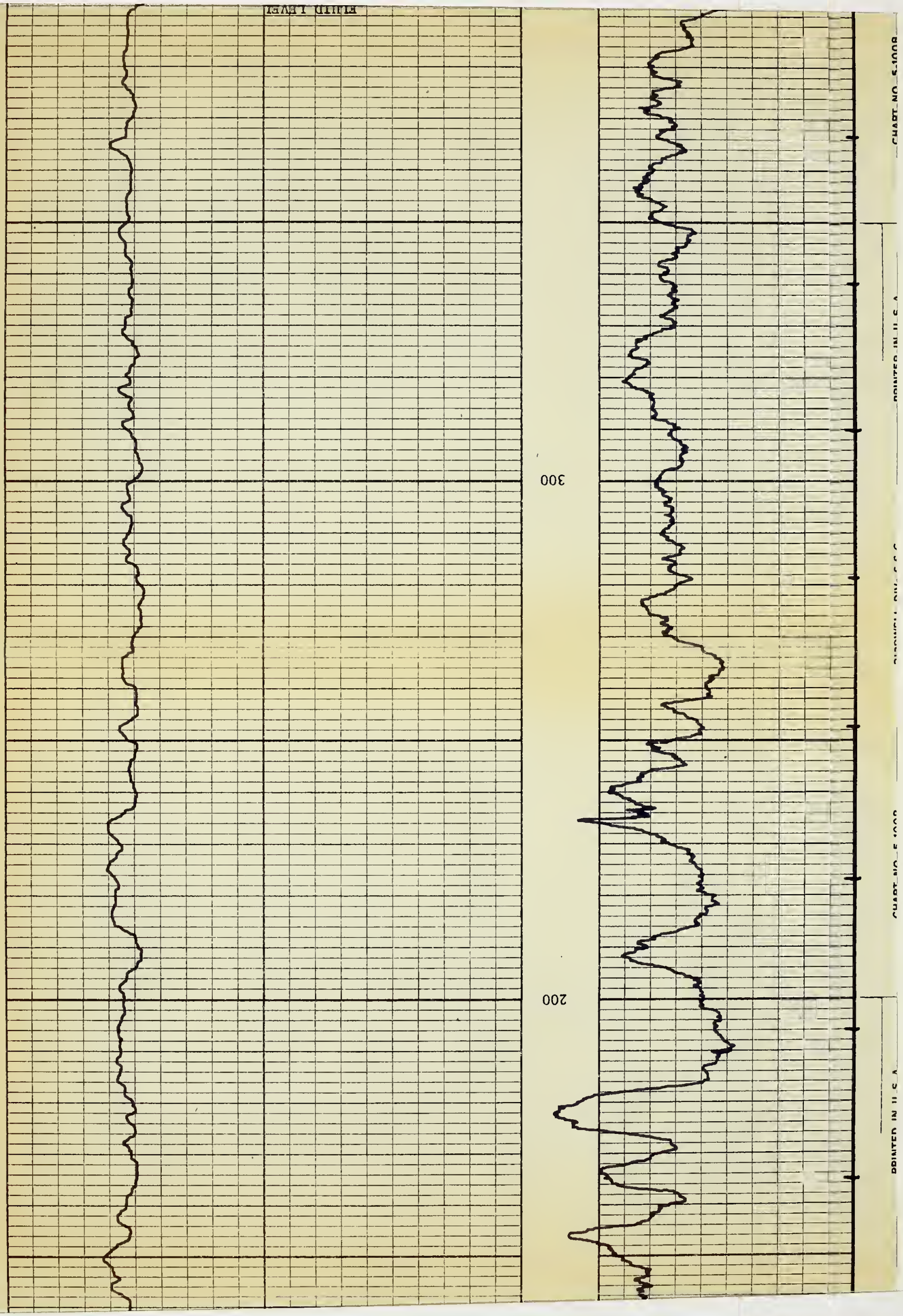
100

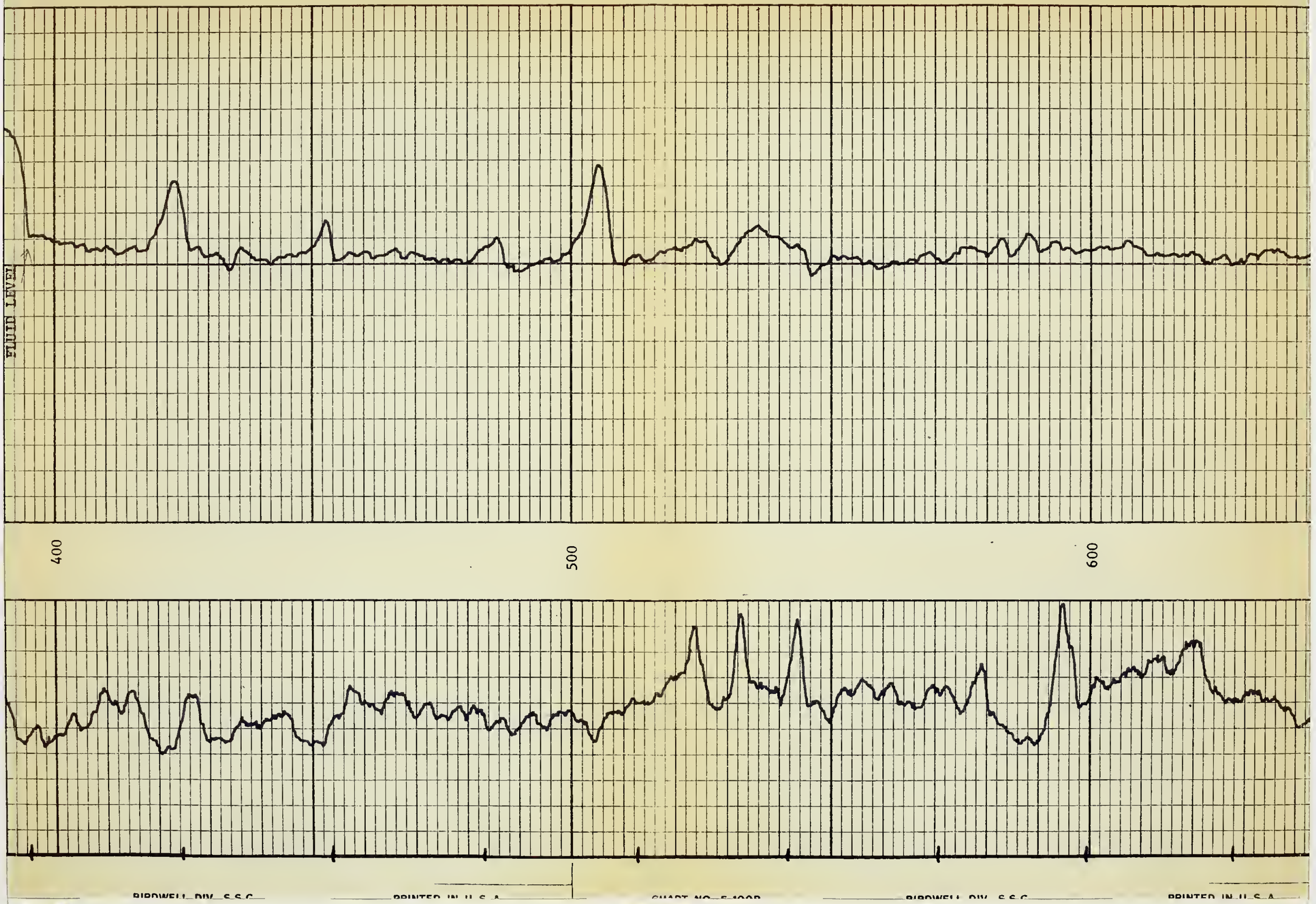
10.5%

1%

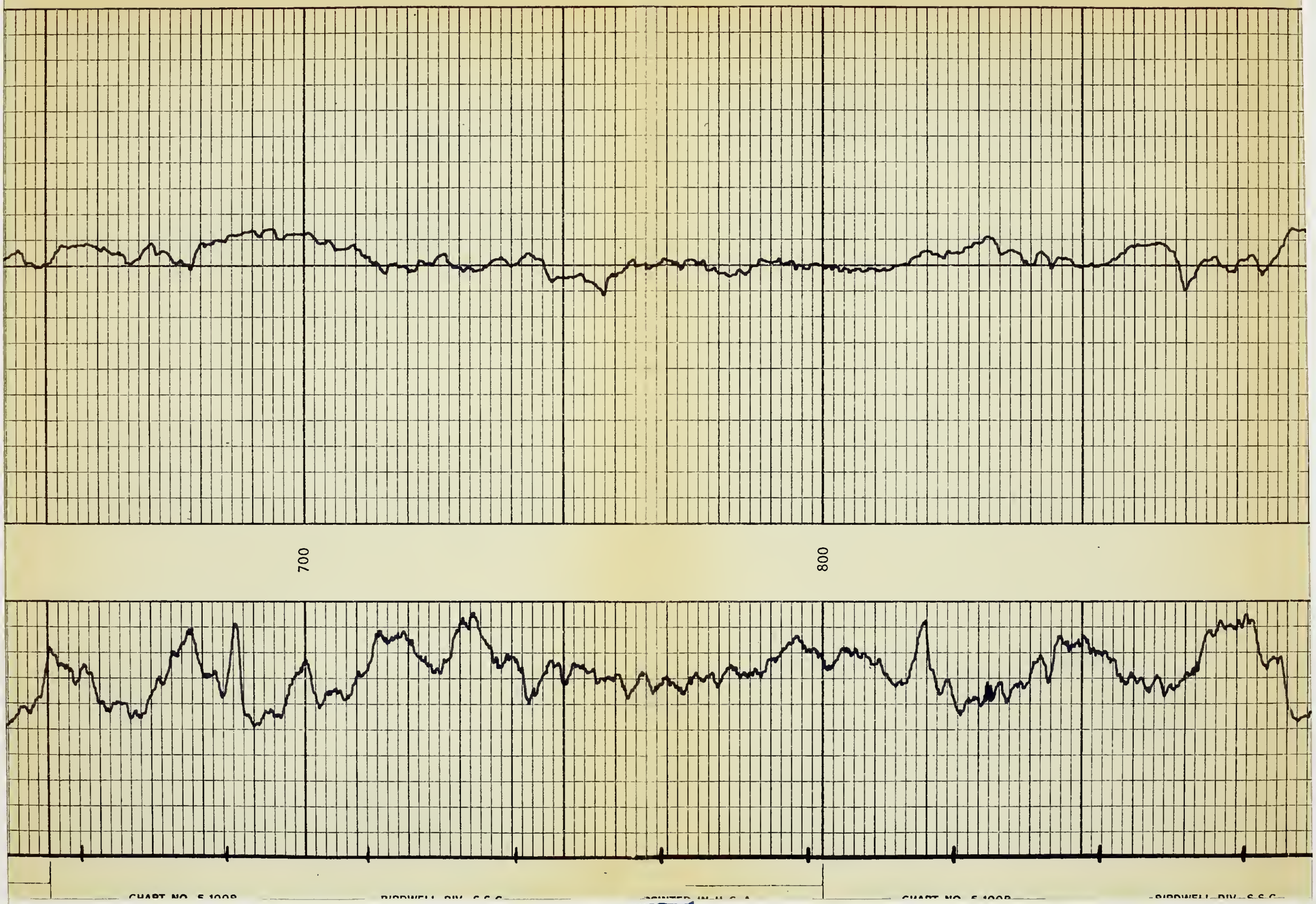
10K

25K


FLUID LEVEL
300
200
CHART NO. 5-1008
PRINTED IN U.S.A.



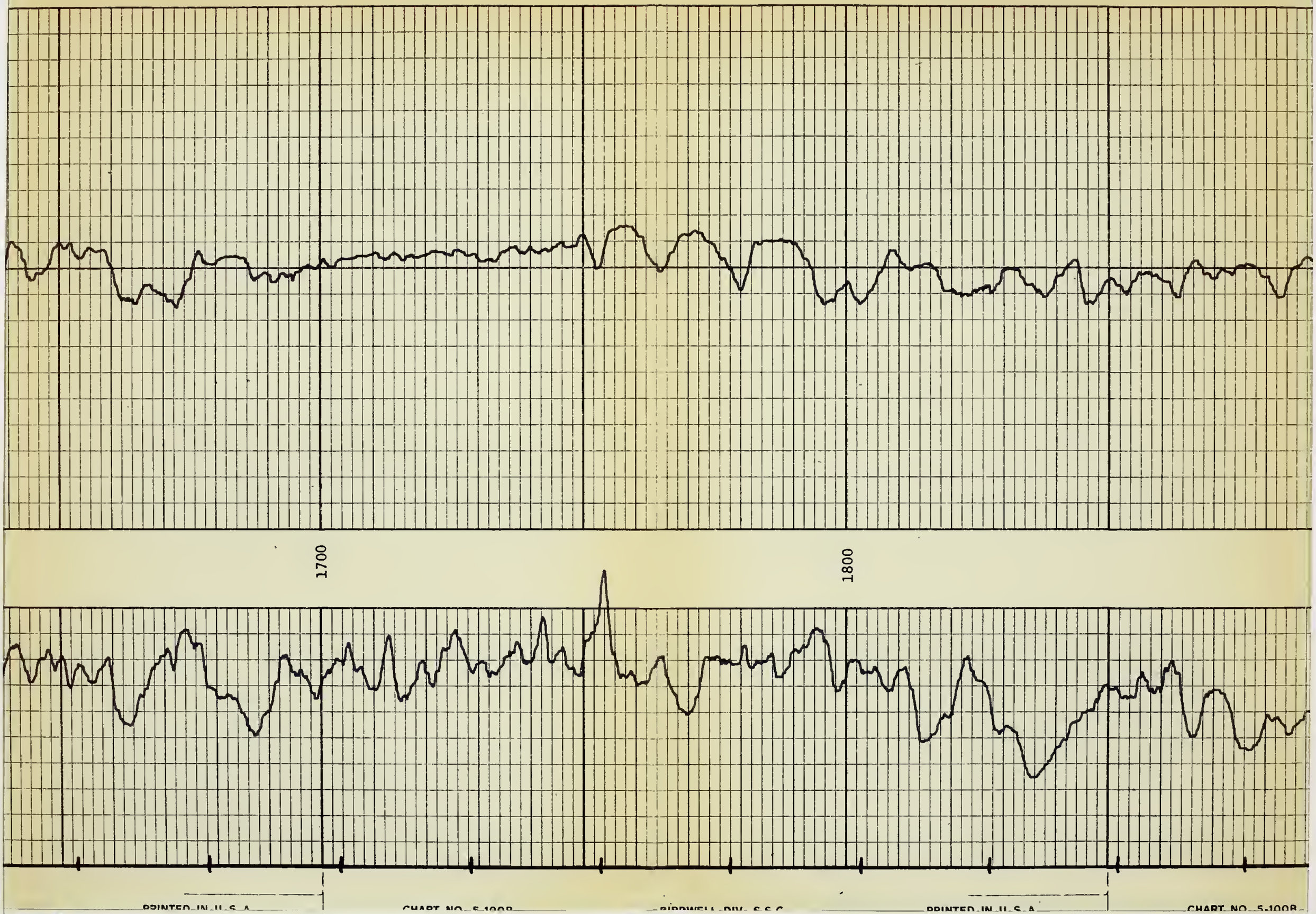

BIRDWELL DIV. S.S.C. PRINTED IN U.S.A. CHART NO. 5-400B BIRDWELL DIV. S.S.C. PRINTED IN U.S.A.


700
800

900
1000
1100

1200
1300

1400
1500
1600


1700
1800
PRINTED IN U.S.A.
CHART NO. 5-100B
BIRDWELL DIV. S.S.C.
PRINTED IN U.S.A.
CHART NO. 5-100B

1900

2000

2100

BIRDWELL DIV. S.S.C. PRINTED IN U.S.A. CHART NO. 5-1008 BIRDWELL DIV. S.S.C. PRINTED IN U.S.A.

CHART NO. 5-100B

BIRDWELL DIV. S.S.C.

PRINTED IN U.S.A.

CHART NO. 5008

R.D. 2195'

2200

T.D. 2206'

0

GR

10K

R.D. 2204'

CALIBRATION DATA

BEFORE LOG

10.5%

1%

10K

25K

# Birdwell

## Caliper Log

FILING NO.

COMPANY ATLANTIC RICHFIELD COMPANY, ET. AL.

WELL SORGHUM GULCH #H-10

FIELD

COUNTY RIO BLANCO STATE COLORADO

LOCATION:

97' FNL & 184' FEL

OTHER SERVICES:

SEC. 13 TWP. 3S RGE. 97W

PERMANENT DATUM GROUND LEVEL ELEV. 6950'
LOG MEASURED FROM GL
DRILLING MEASURED FROM GL

ELEVATIONS:
KB.
DF.
GL. 6950'

| | | | |
|---|---|---|---|
| DATE | 29 JUNE 74 | | |
| RUN NO. | | | |
| TYPE LOG | CAL | | |
| DEPTH—DRILLER | 2211 | | |
| DEPTH—LOGGER | 2206 | | |
| BOTTOM LOGGED INTERVAL | 2204 | | |
| TOP LOGGED INTERVAL | 20 | | |
| TYPE FLUID IN HOLE | WATER | | |
| SALINITY PPM CL. | | | |
| DENSITY LB./GAL. | | | |
| LEVEL | 394 | | |
| MAX. REC. TEMP.—DEG. F. | 98° | | |
| OPR. RIG TIME | 1 HR. | | |
| RECORDED BY | WILSON | | |
| WITNESSED BY | TAIT | | |
| LOCATION | LAS VEGAS | | |

| RUN NO. | BORE HOLE RECORD BIT | FROM | TO | CASING RECORD SIZE | WGT. | FROM | TO |
|---|---|---|---|---|---|---|---|
| 1 | | | | 7" | | 0 | 62' |
| | 5-5/8" | 62' | 1200' | | | | |
| | 4-7/8" | 1200' | 2211' | | | | |
| | | | | | | | |
| | | | | | | | |

SSC—607-D

WELL DATA

ORIGINAL TOTAL DEPTH
P.B.T.D.
TYPE WELL
OPEN HOLE SHOT WITH
AMOUNT FM. TO
AMOUNT FM. TO
AMOUNT FM. TO
SPECIAL WELL CONDITIONS:
PURPOSE OF SURVEY

EQUIPMENT DATA

| | CALIPER |
|---|---|
| TYPE LOG | |
| TOOL MODEL | LEBB |
| TOOL SERIAL NO. | |
| TOOL DIAMETER | 3-5/8" |
| SPEED FT./MIN. | 40 |
| SCALE | 1/2"/DIV. |
| MIN. ARM DIAM. | 3-5/8" |
| MAX. ARM DIAM. | 34" |
| TRUCK NO. | 2694 |

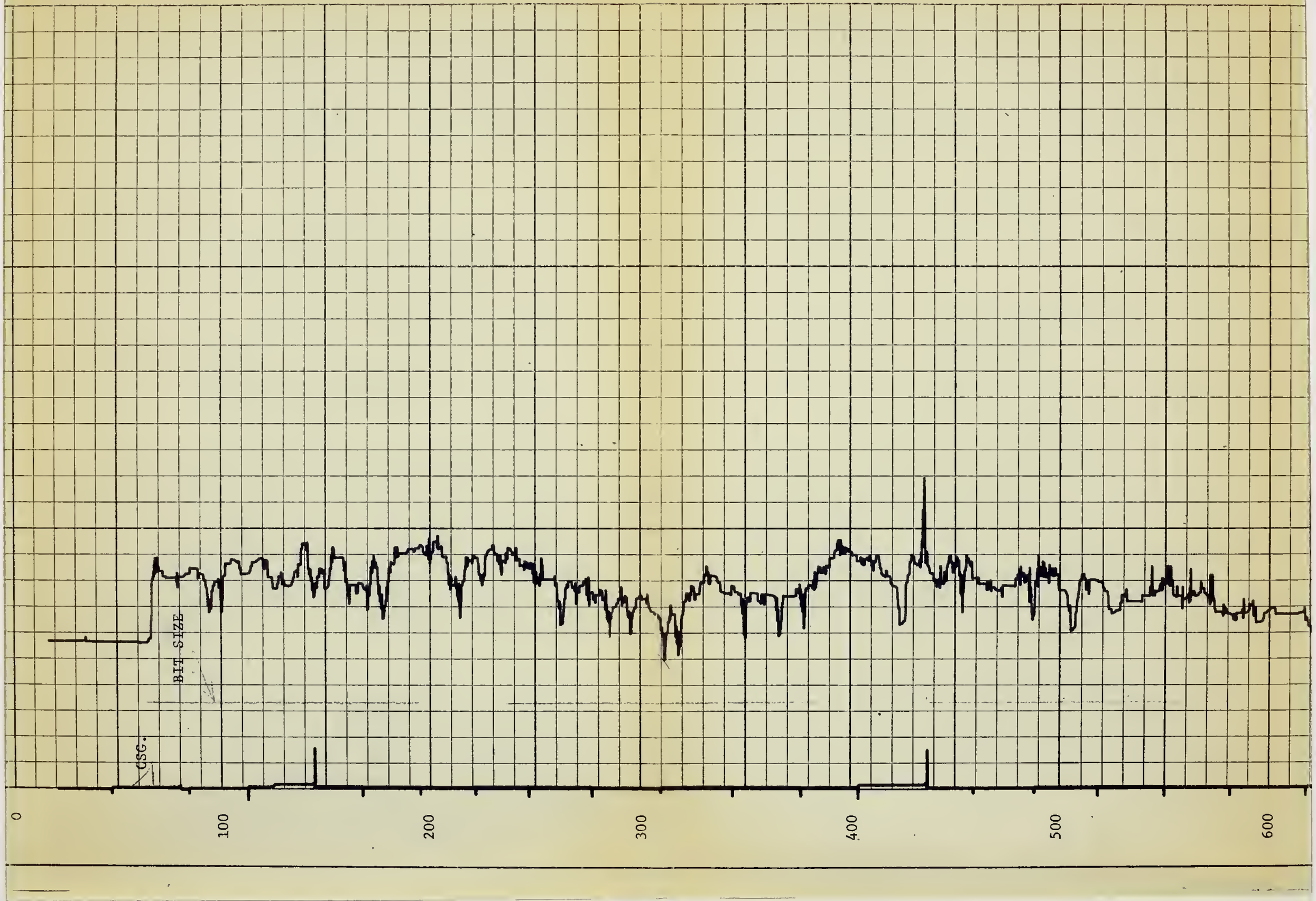
REMARKS: (N.A. MEANS NOT AVAILABLE)

HOLE DIAMETER IN INCHES

9 14

DEPTHS

INTEGRATED HOLE VOLUME
10 CU.FT./FT.


CSG.
BIT SIZE
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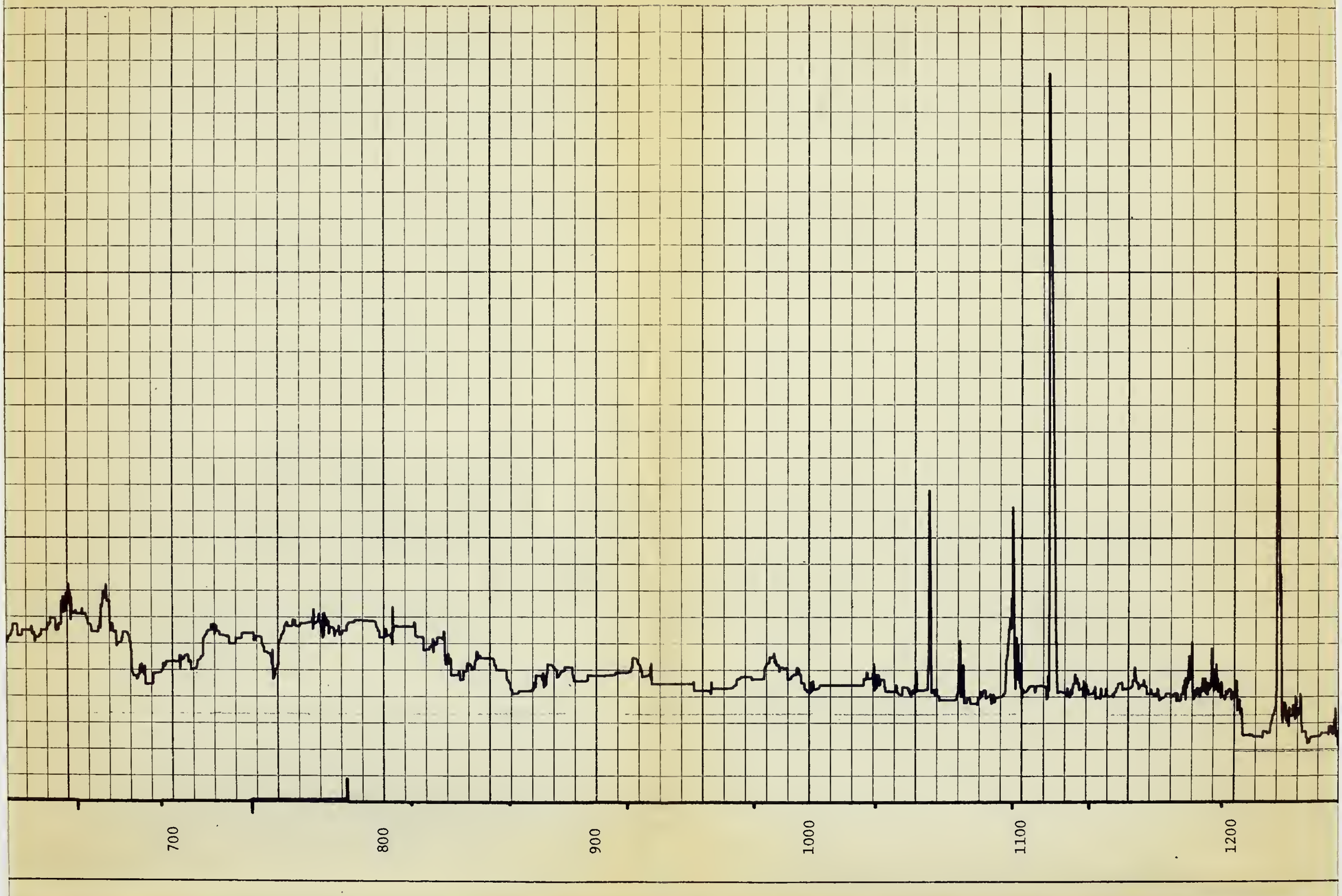
300
400
500
600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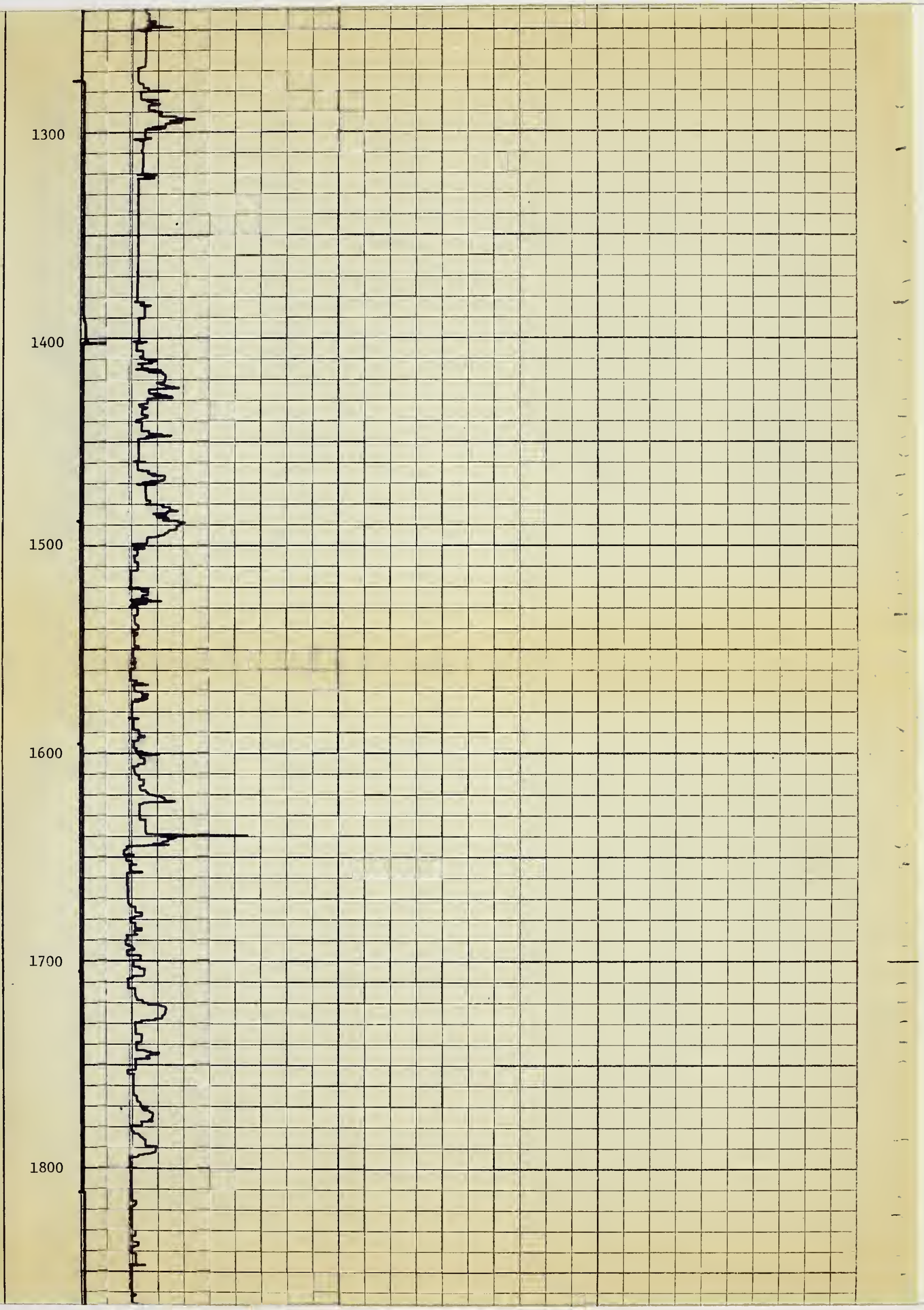
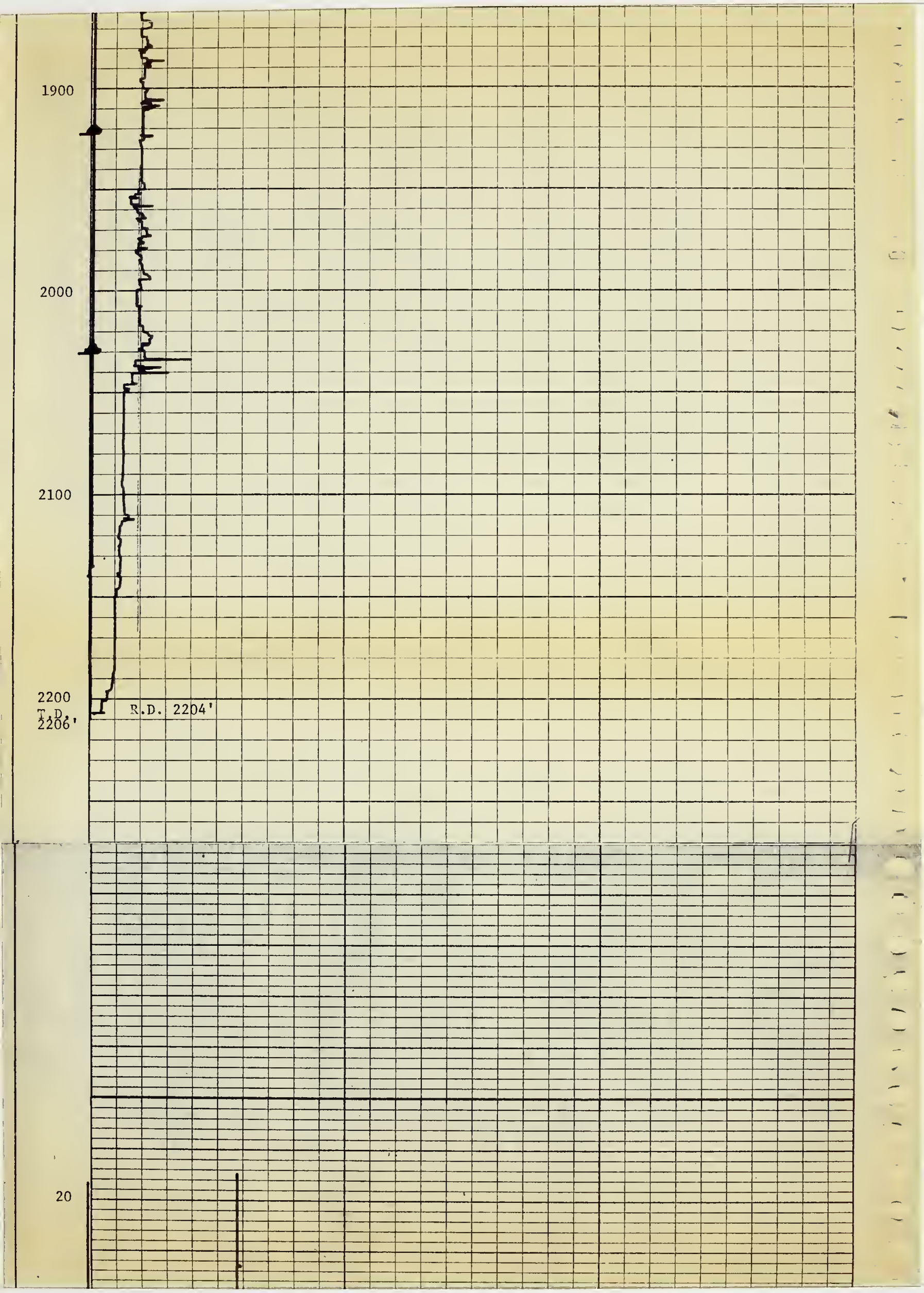
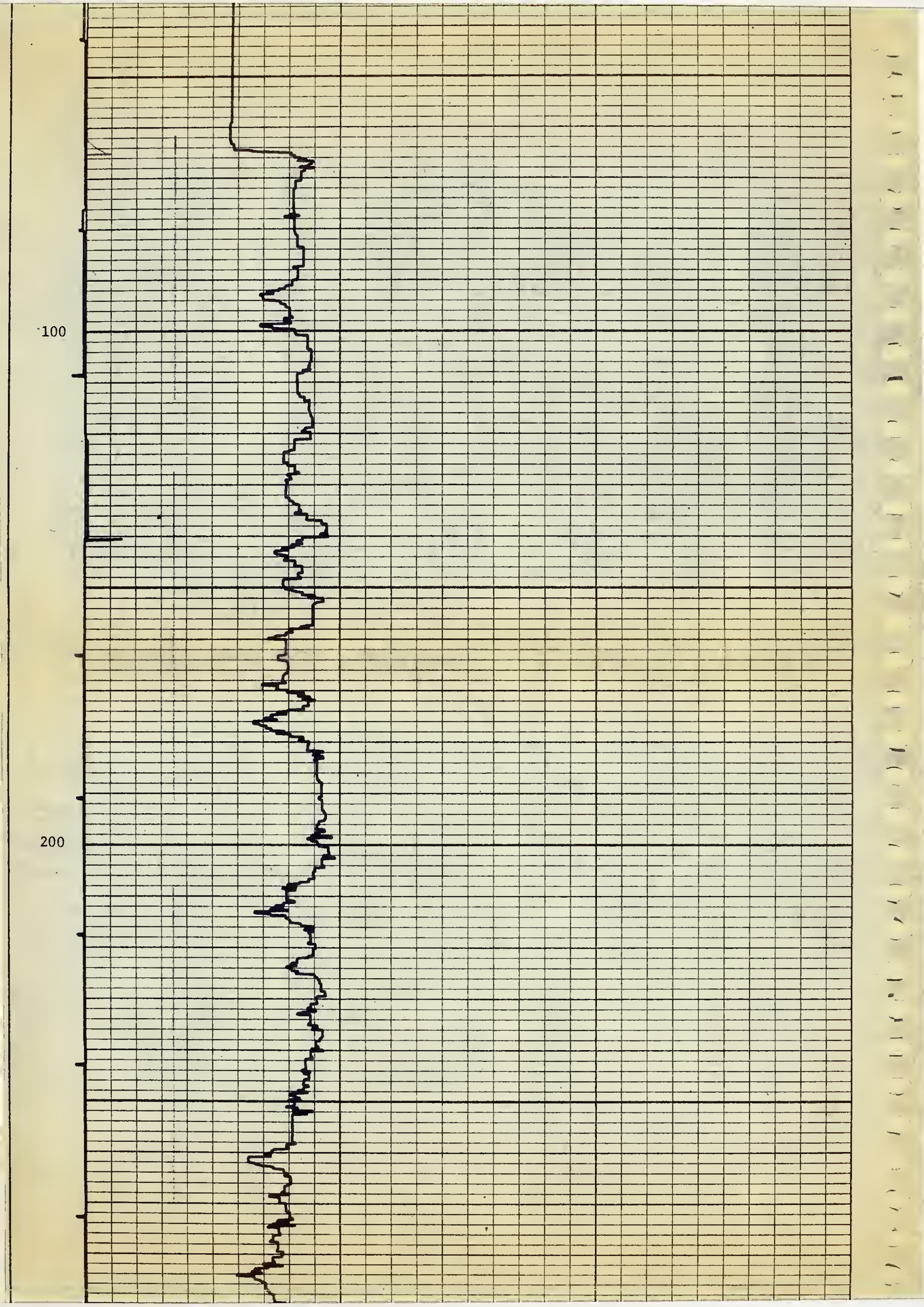
800
900
1000
1100
1200


1300
1400
1500
1600
1700
1800


1900
2000
2100
2200
T.D.
2206'
R.D. 2204'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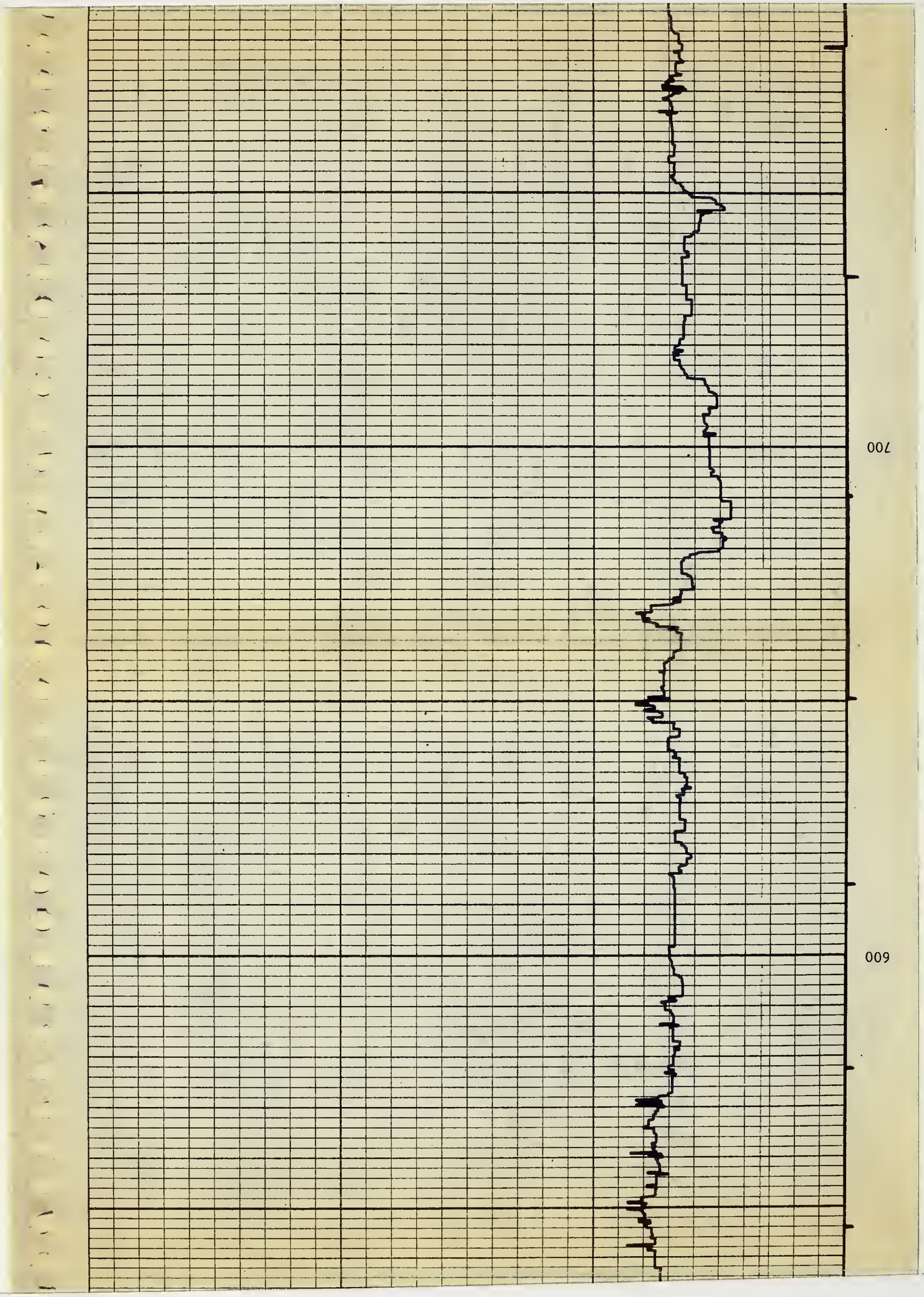
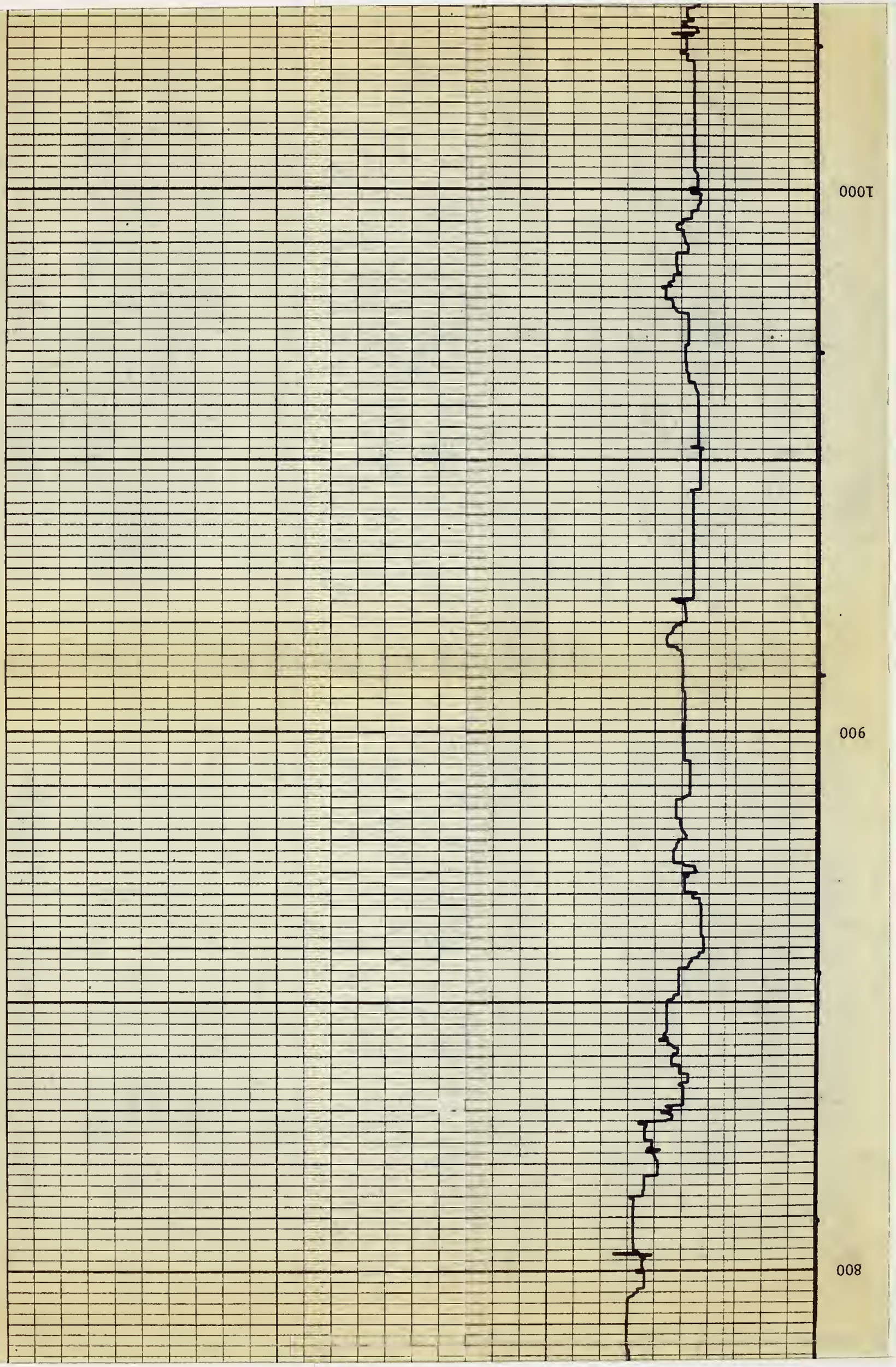
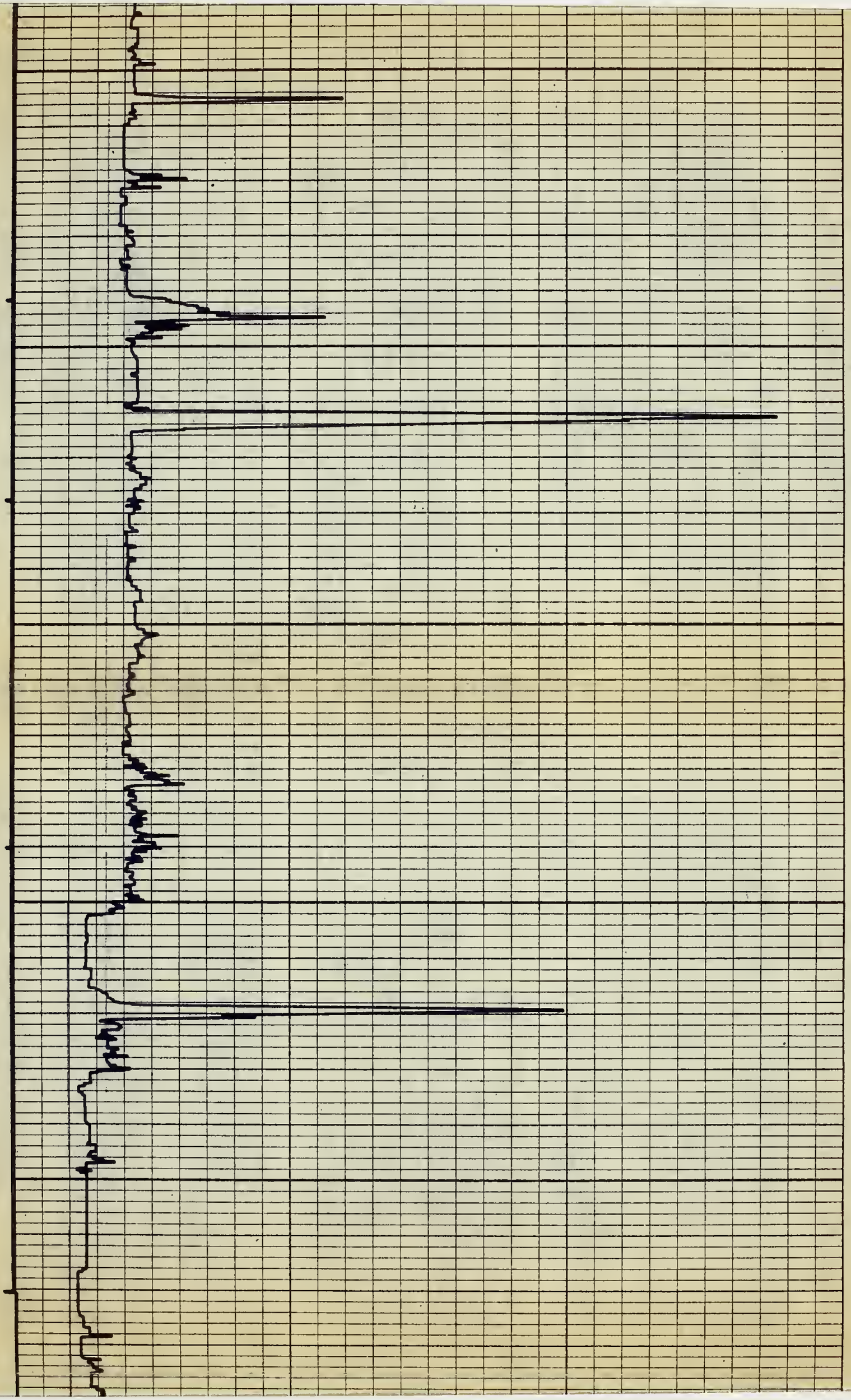
200

300
400
500


700
009


1000
006
008


1100
1200

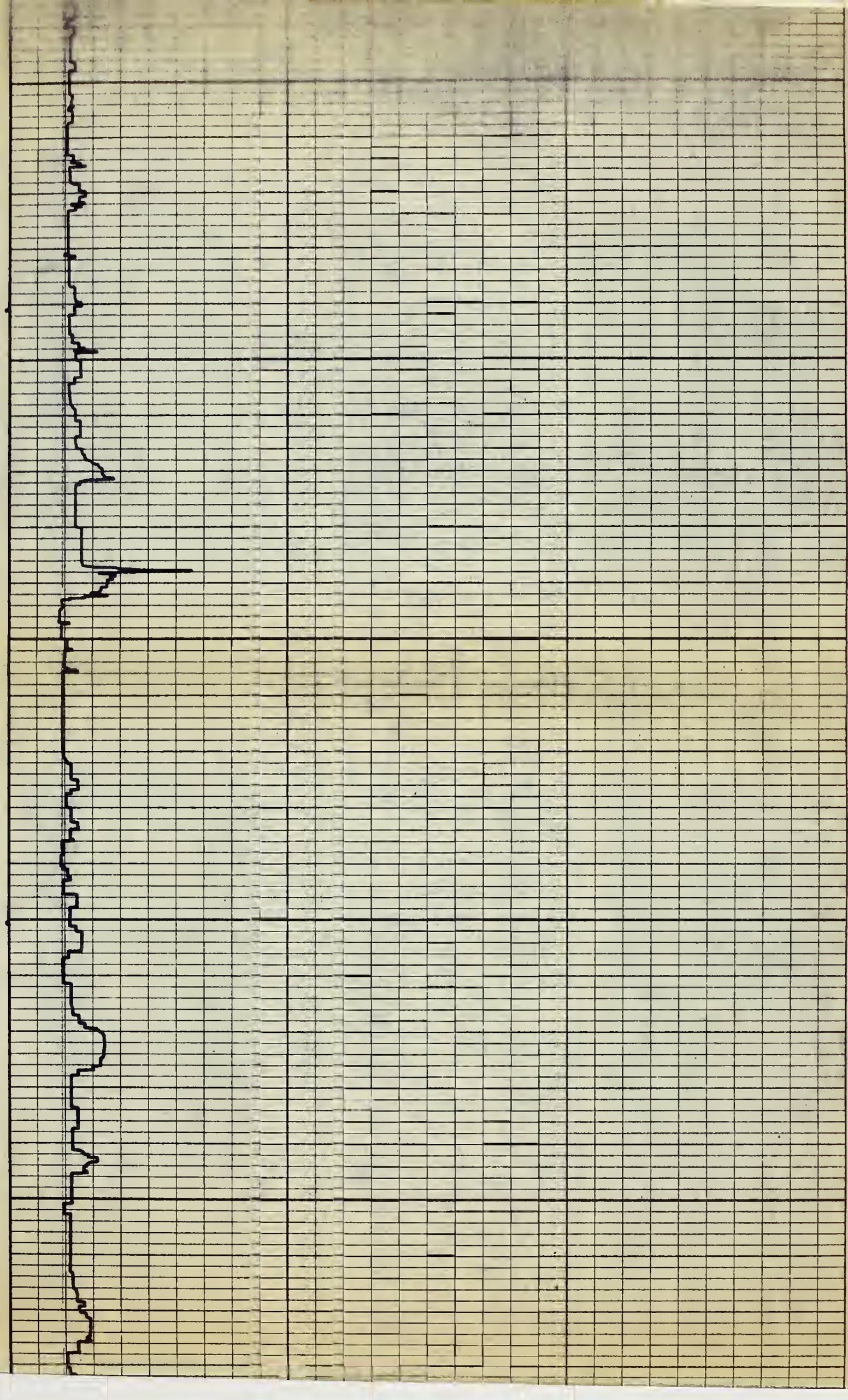
1300

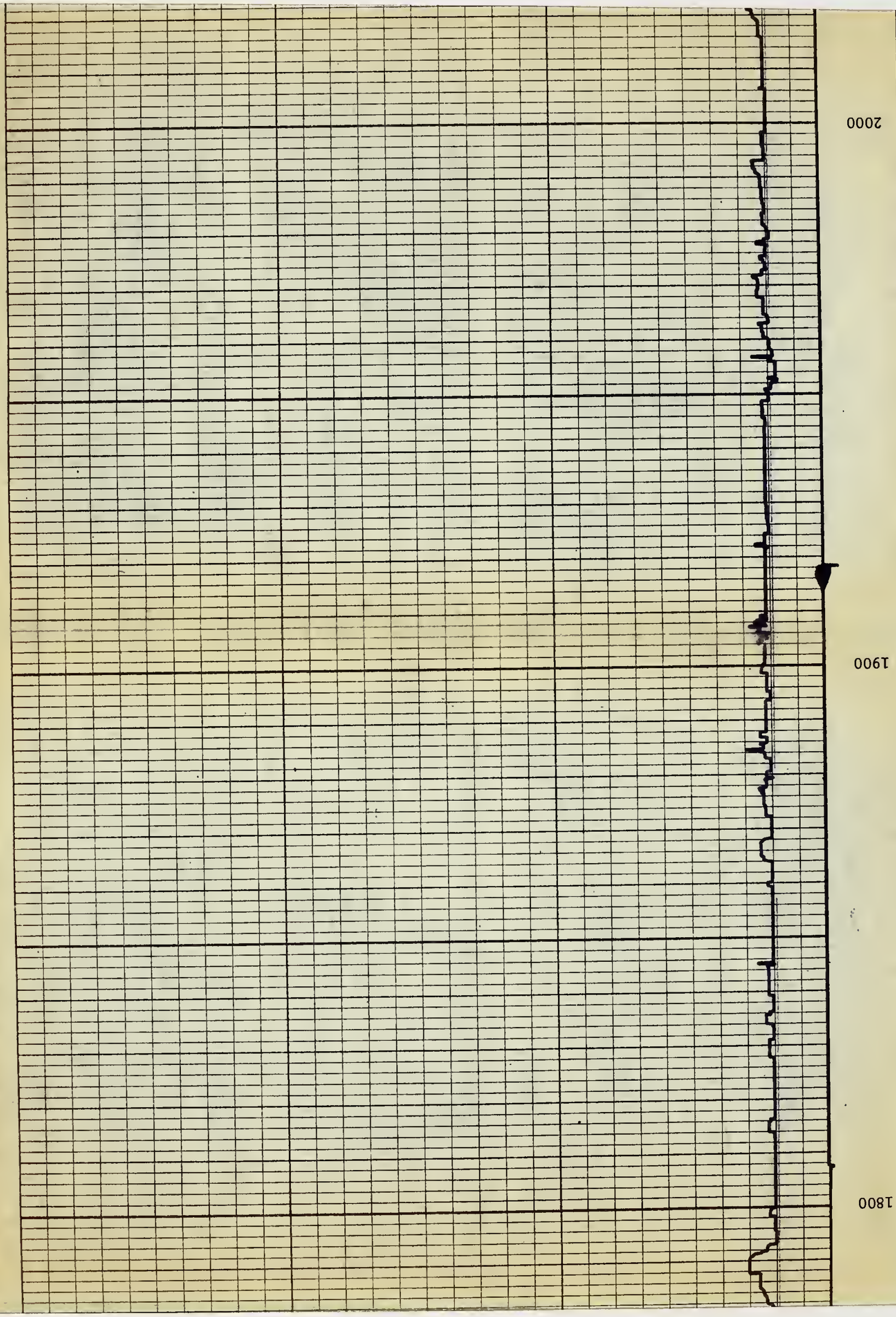
1400

1500

1600

1700




2000
1900
1800

2100

2200
T.D.
2206'

R.D. 2204'

# Birdwell

## Temperature Log

FILING NO.

**COMPANY** ATLANTIC RICHFIELD COMPANY, ET. AL.

**WELL** SORGNUM GULCH #H-10

**FIELD**

**COUNTY** RIO BLANCO **STATE** COLORADO

**LOCATION:** 97' FNL & 184' FEL

SEC. 13 TWP. 3S RGE. 97W

**OTHER SERVICES:** CAL FDL V3D GR ENP ES

**ELEVATIONS:** KB. DF. GL. 6950'

PERMANENT DATUM GROUND LEVEL ELEV. 6950'
LOG MEASURED FROM GL
DRILLING MEASURED FROM GL

| | | | |
|---|---|---|---|
| DATE | 29 JUNE 74 | | |
| RUN NO. | 1 | | |
| TYPE LOG | TL | | |
| DEPTH—DRILLER | 2211 | | |
| DEPTH—LOGGER | 2206 | | |
| BOTTOM LOGGED INTERVAL | 2206 | | |
| TOP LOGGED INTERVAL | 400 | | |
| TYPE FLUID IN HOLE | WATER | | |
| SALINITY PPM CL. | | | |
| DENSITY LB./GAL. | | | |
| LEVEL | 394 | | |
| MAX. REC. TEMP.—DEG. F. | 98° | | |
| OPR. RIG TIME | 1 HR. | | |
| RECORDED BY | WILSON | | |
| WITNESSED BY | TAIT | | |
| LOCATION | LAS VEGAS | | |

| RUN NO. | BORE HOLE RECORD BIT | FROM | TO | CASING RECORD SIZE | WGT. | FROM | TO |
|---|---|---|---|---|---|---|---|
| 1 | | | | 7" | | 0 | 62' |
| | 5-5/8" | 62' | 1200' | | | | |
| | 4-7/8" | 1200' | 2211' | | | | |
| | | | | | | | |
| | | | | | | | |

SSC-609-B

**WELL DATA**

| | |
|---|---|
| TYPE WELL | |
| RUN NO. | |
| PROD. OR INJ. RATE | |
| WELL HEAD PRESSURE | |
| TYPE & AMT. CEMENT | |
| LENGTH OF TIME: | |
| PROD. OR INJECTING | |
| SHUT IN | |
| SINCE CEMENTING | |

PURPOSE OF SURVEY

**EQUIPMENT DATA**

| | |
|---|---|
| TYPE LOG | TL |
| RUN NO. | 1 |
| TOOL MODEL NO. | LDAH-6010 |
| DIAM. | 3-5/8" |
| SPEED FT./MIN. | 60 |
| T. C. - SEC. | 1 |
| SCALE | 1/4°/DIV. |

**GENERAL**

| | |
|---|---|
| HOIST TRUCK NO. | 2694 |
| INST. TRUCK NO. | 2694 |
| TOOL SERIAL NO. | |

REMARKS: N.A. Means not available

TEMPERATURE
DEGREES FAHRENHEIT

DEPTH

60 61 62 63 64 65 66 67

400

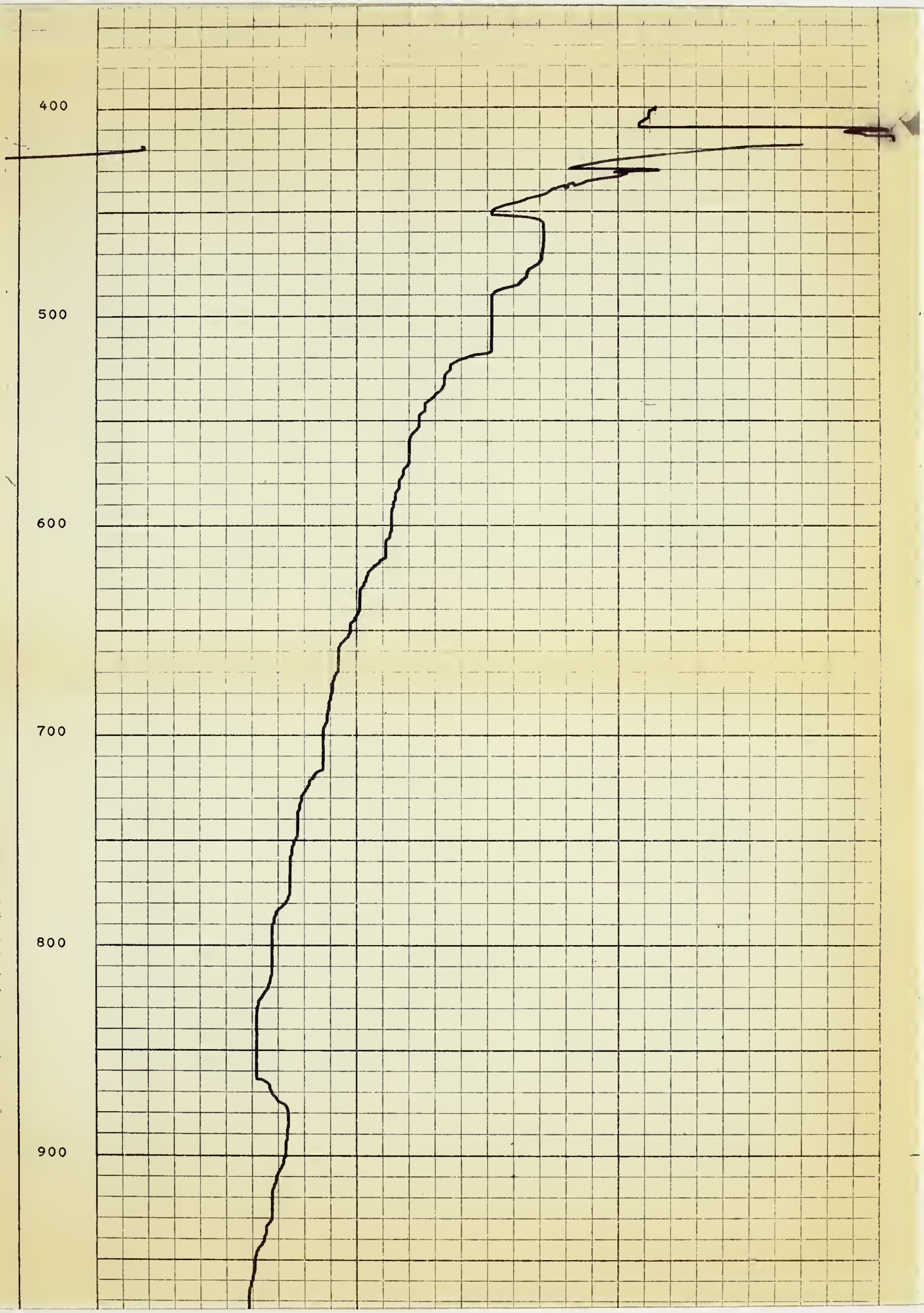
500

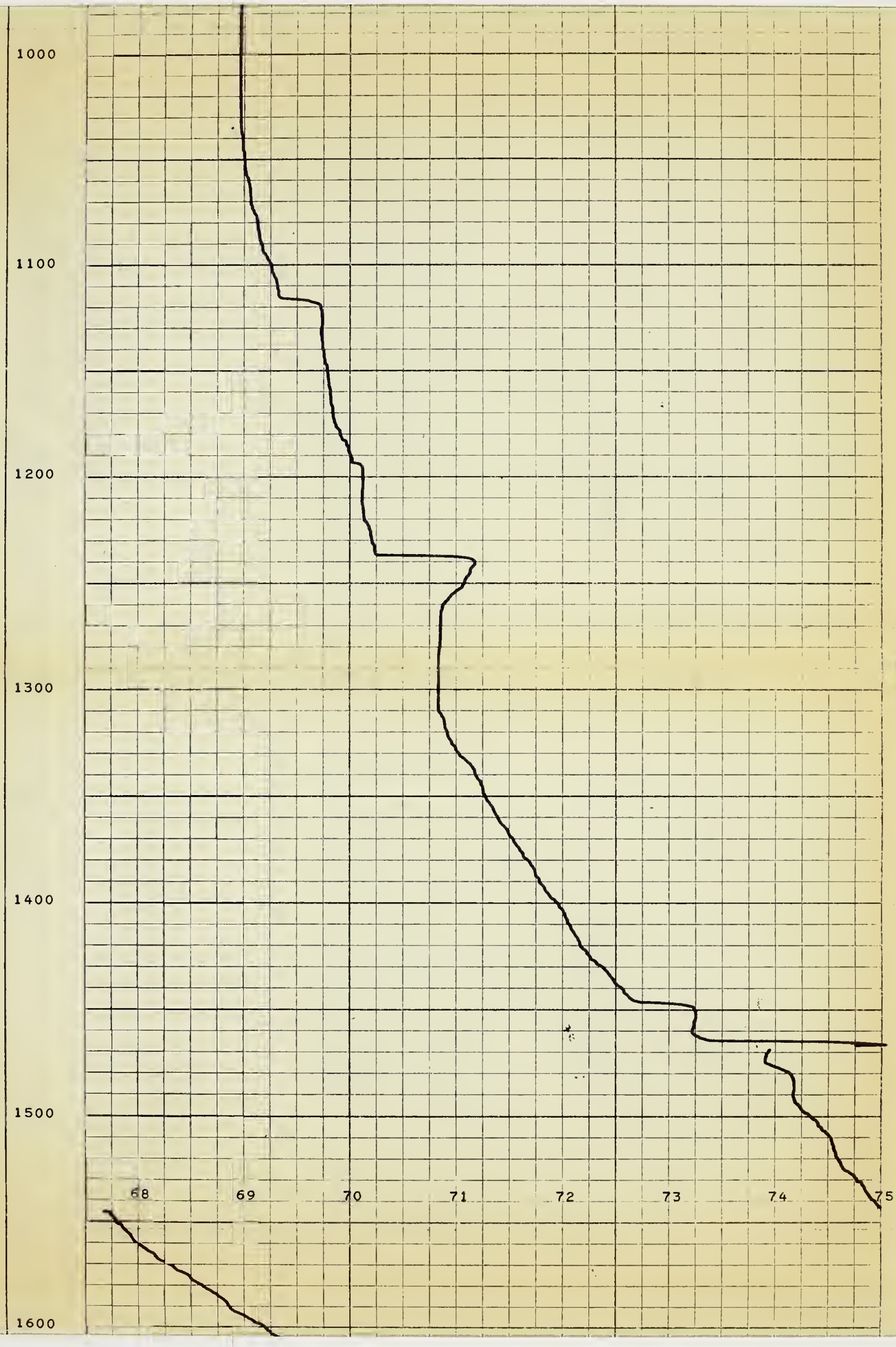
600

700

800

900




1000
1100
1200
1300
1400
1500
1600
68
69
70
71
72
73
74
75

1600

1700

75 76 77 78 79 80 81 82

83 84 85 86 87 88 89 90

1800

1900

90 91 92 93 94 95 96 97

2000

2100

98 99

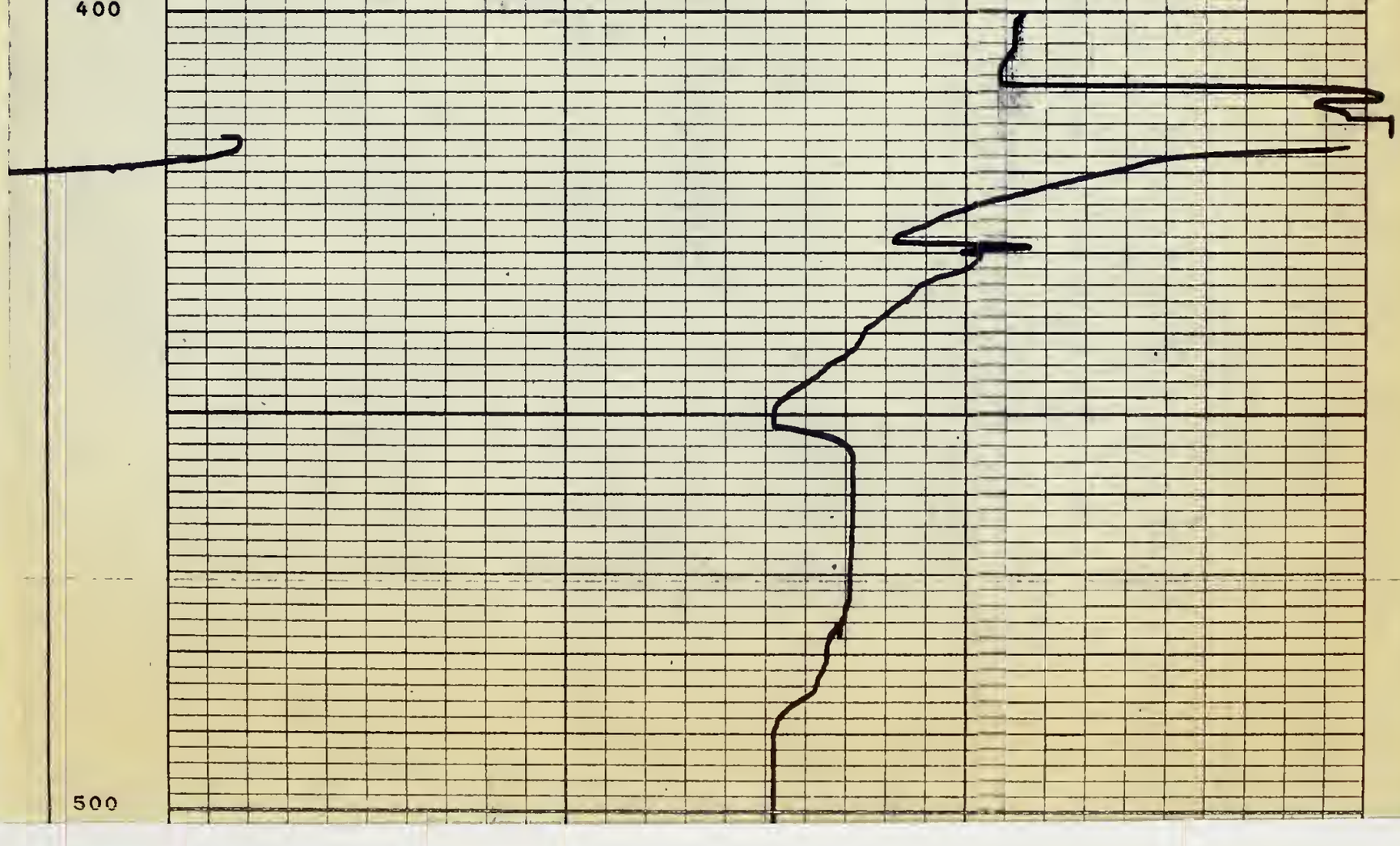
2200
T.D.
2206'

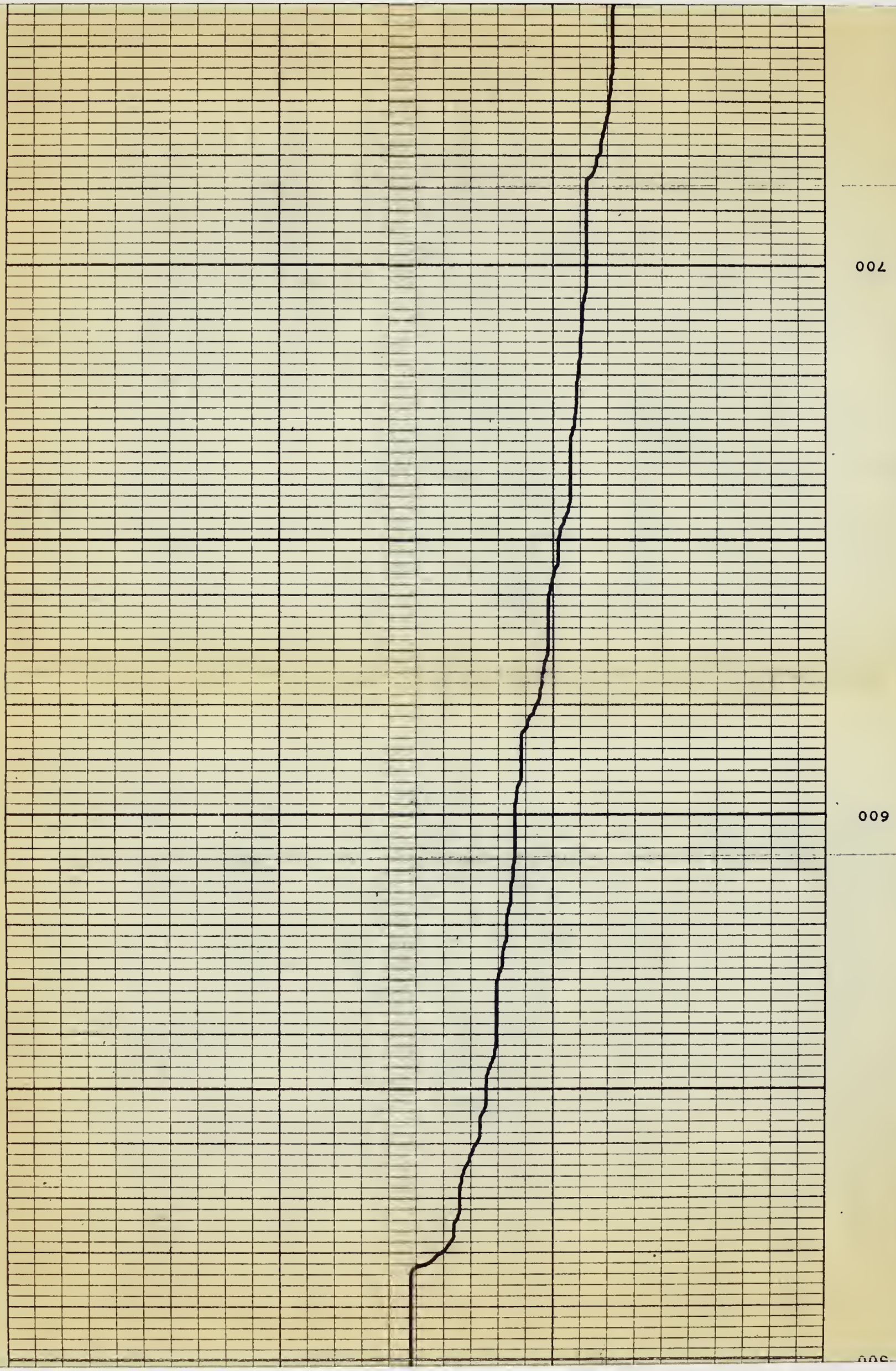
R.D. 2206'

60 61 62 63 64 65 66 67

400

500

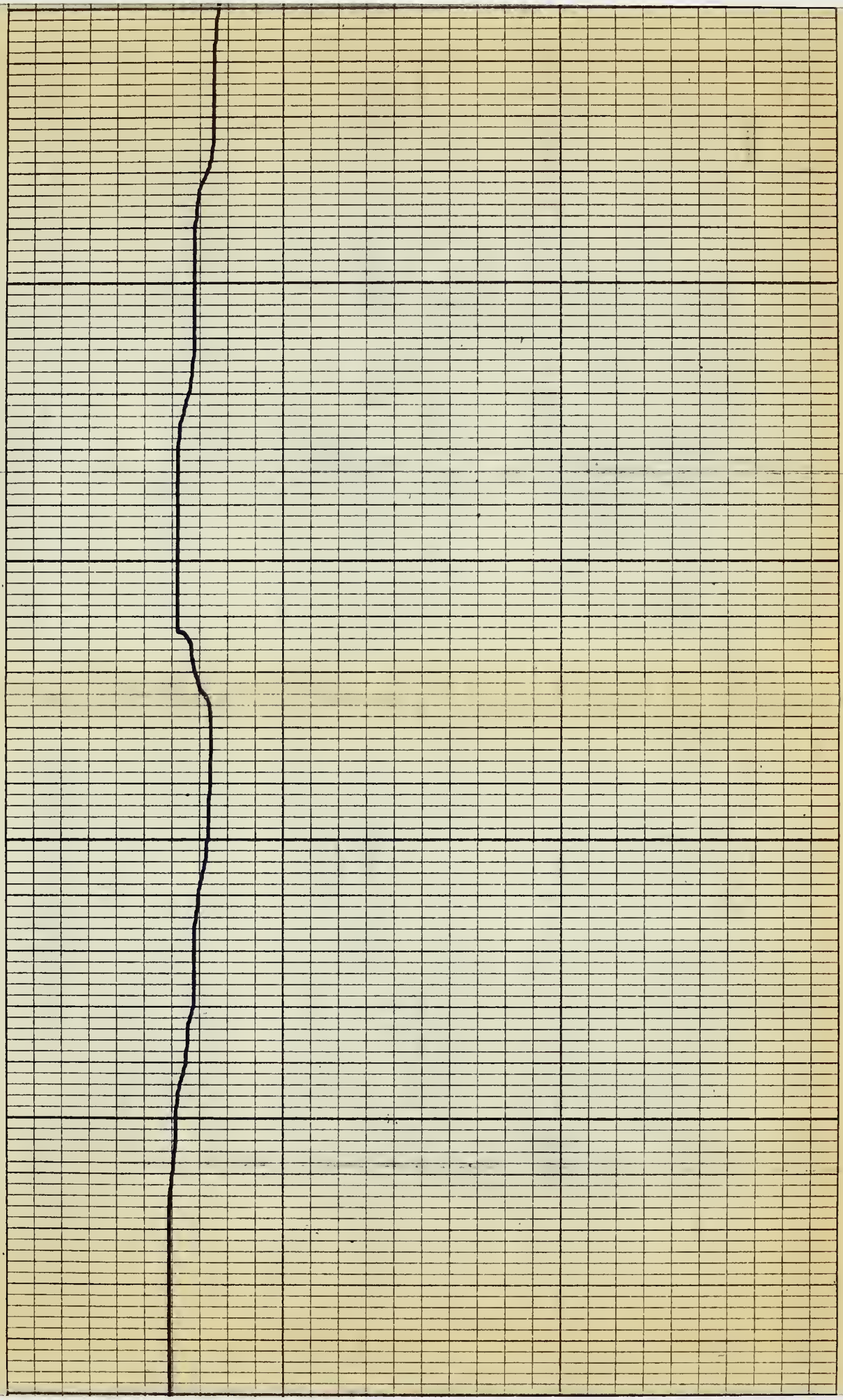



700
600
500

800

900

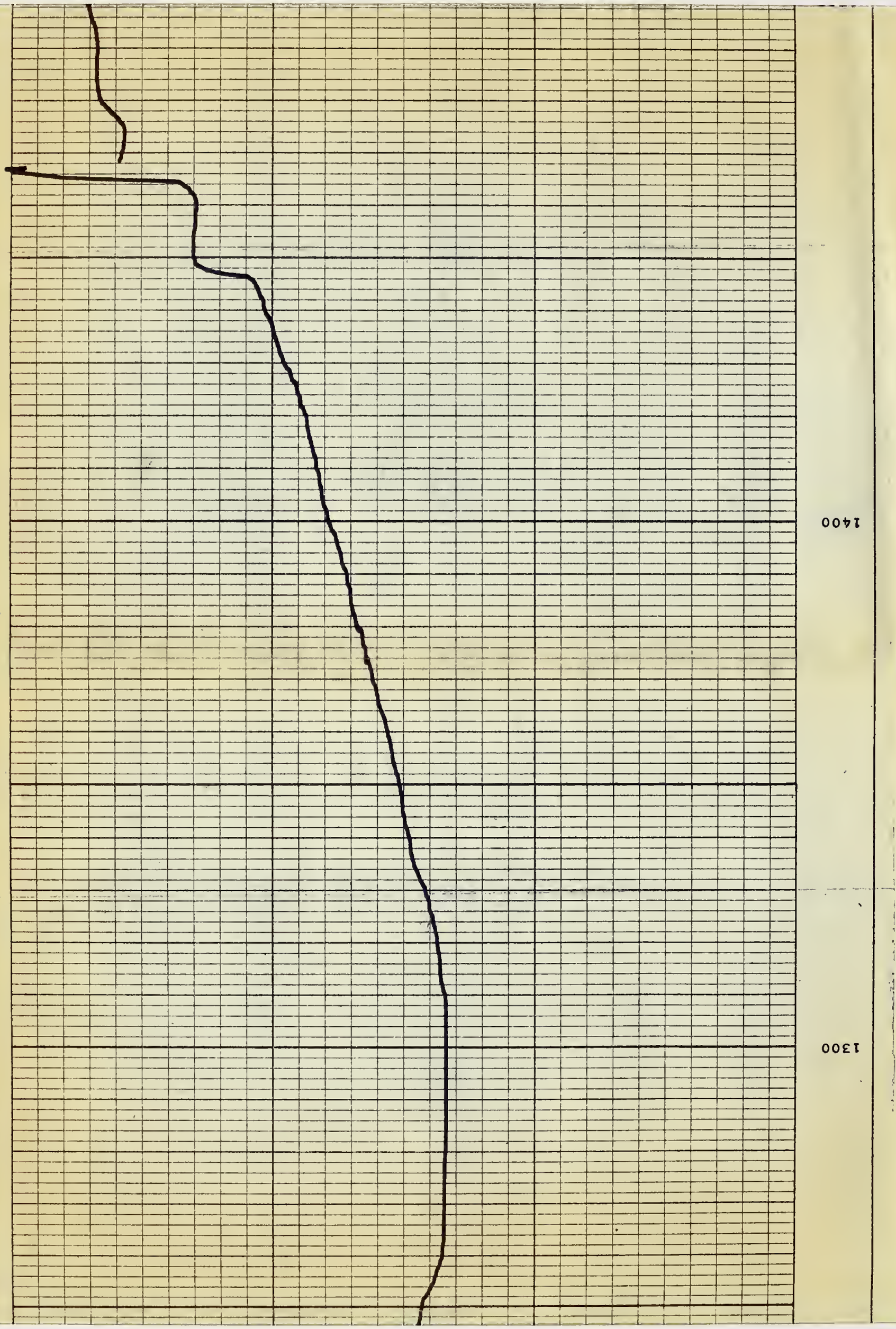
1000

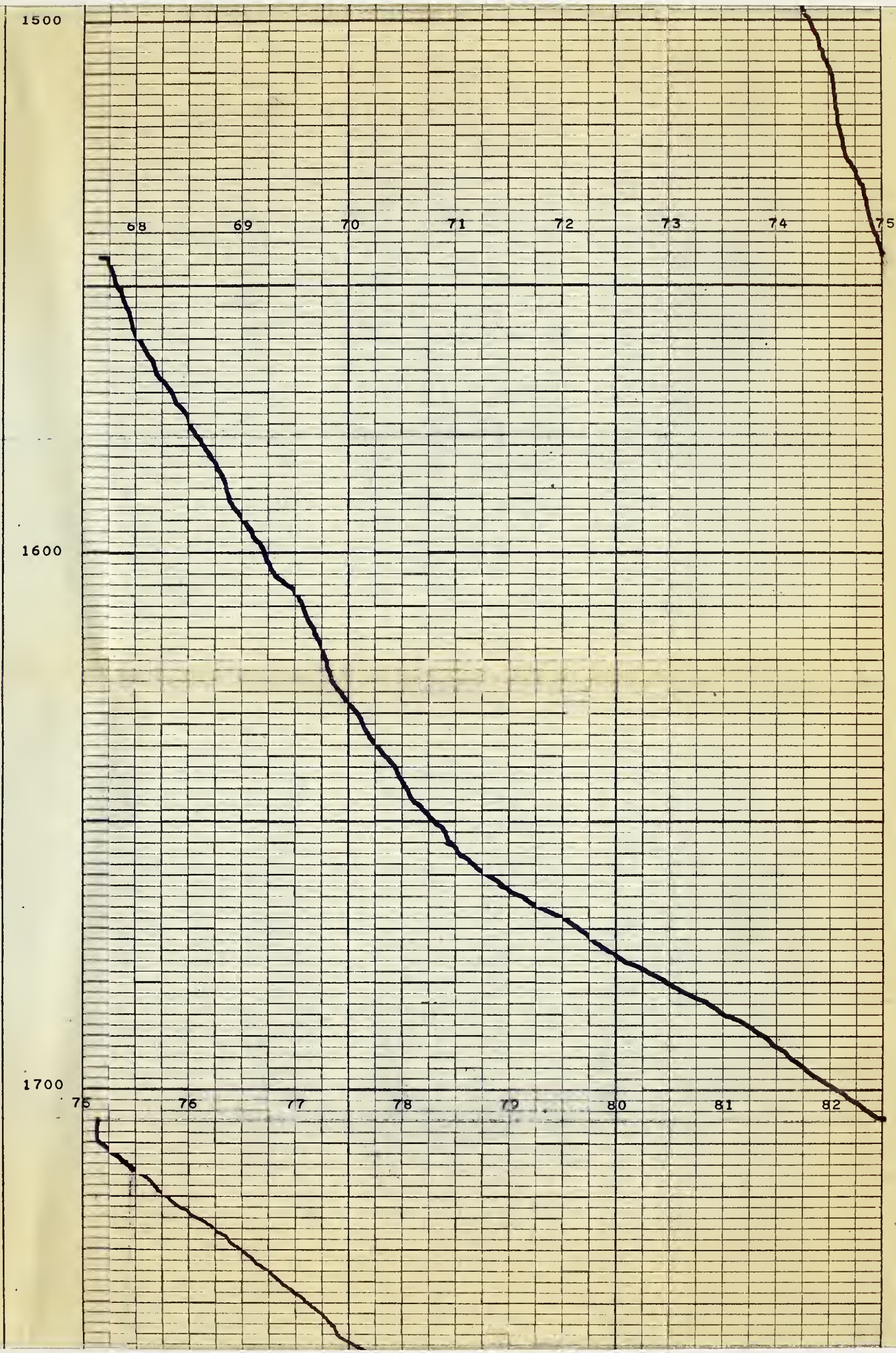


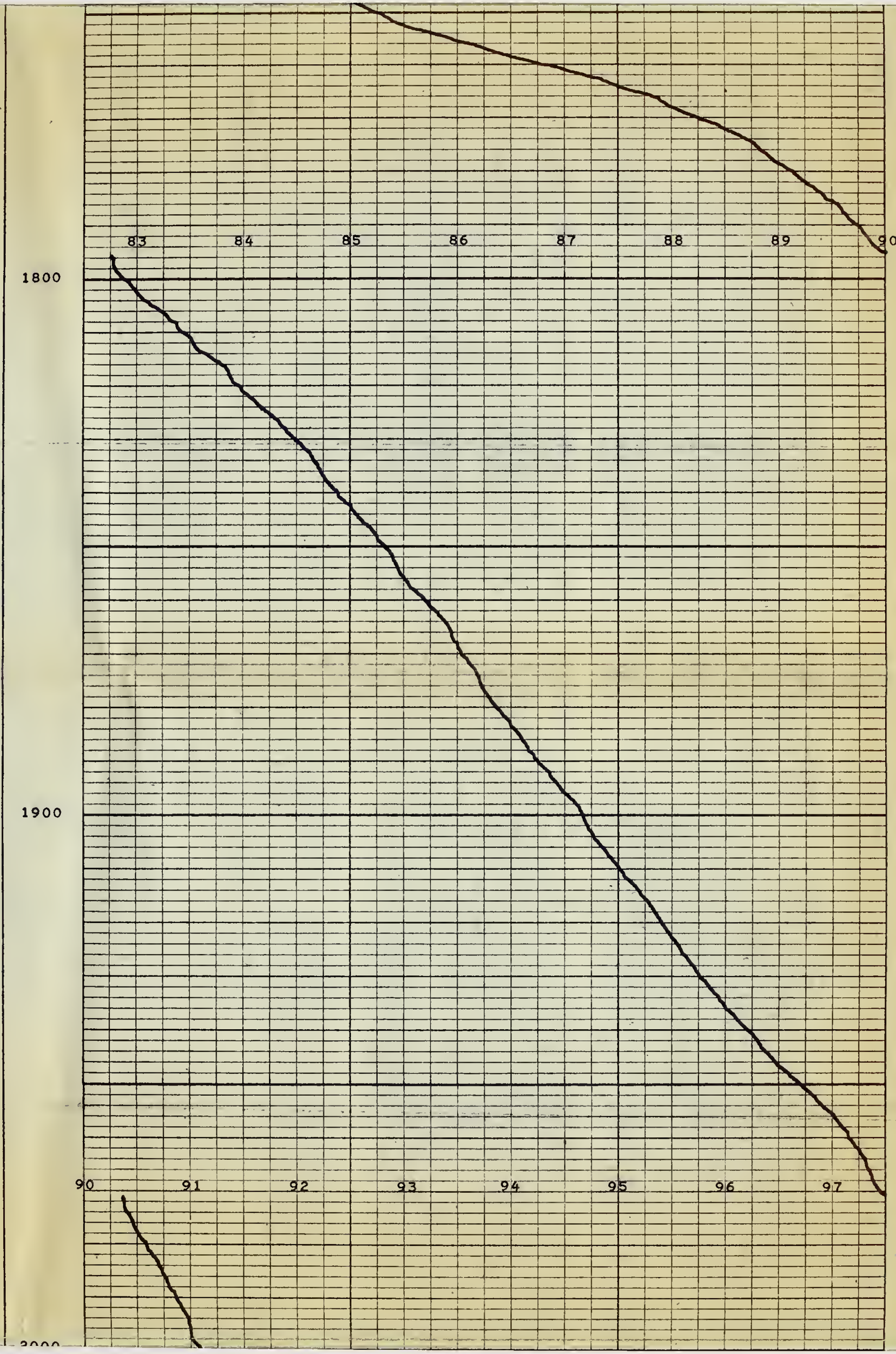
1000

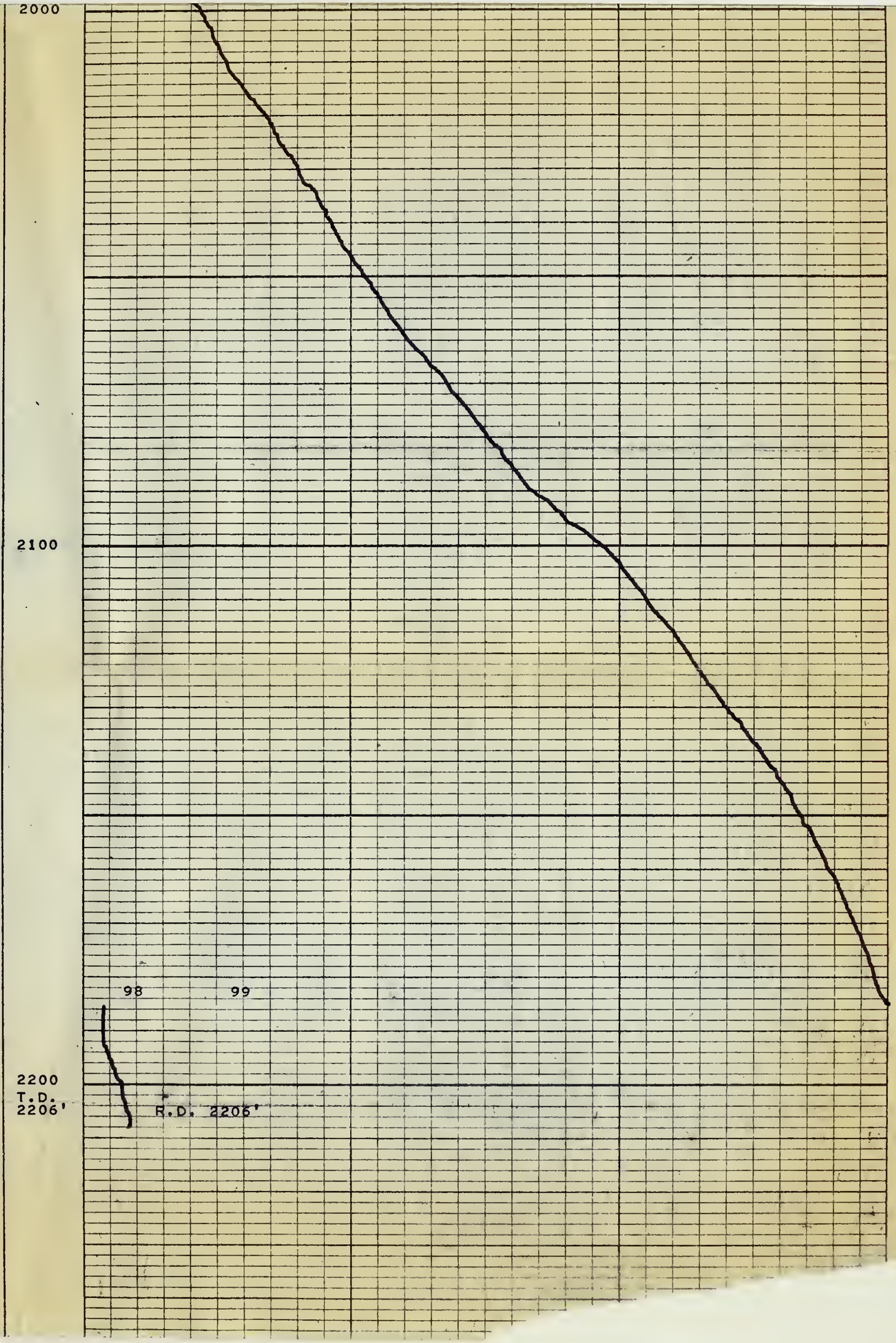
1100

1200


1400
1300


1500
68
69
70
71
72
73
74
75
1600
1700
76
76
77
78
79
80
81
82


83
84
85
86
87
88
89
90
1800
1900
90
91
92
93
94
95
96
97


2000
2100
98
99
2200
T.D.
2206'
R.D. 2206'

COREHOLE SG-11

THIS ENVELOPE CONTAINS THE FOLLOWING GEOPHYSICAL LOGS:

Schlumberger: Borehole Compensated Sonic
Laterolog
Temperature

II B-367

Schlumberger

# BOREHOLE COMPENSATED SONIC LOG - GAMMA RAY

(WITH CALIPER)

COUNTY RIO BLANCO
FIELD or LOCATION SORGHUM GULCH
WELL SORGHUM GULCH #11
COMPANY ATLANTIC RICHFIELD

COMPANY ATLANTIC RICHFIELD COMPANY

WELL SORGHUM GULCH #11

FIELD SORGHUM GULCH

COUNTY RIO BLANCO STATE COLORADO

Location: API Serial No. 12' NSL & 160' WEL

Sec. 7 Twp. 3S Rge. 96W

Other Services: TEMP DLL-9

Permanent Datum: G.L. ; Elev.: 6900
Log Measured From G.L. , 0 Ft. Above Perm. Datum
Drilling Measured From G.L.

Elev.: K.B.
D.F. "
G.L. 6900

| | | | | |
|---|---|---|---|---|
| Date | 9-3-74 | | | |
| Run No. | ONE | | | |
| Depth—Driller | 2826 | | | |
| Depth—Logger | 2824 | | | |
| Btm. Log Interval | 2815 | | | |
| Top Log Interval | 50 | | | |
| Casing—Driller | 8 5/8 @ 62 | @ | @ | @ |
| Casing—Logger | 50 | | | |
| Bit Size | 6 1/4 TO 1282, 4 7/8 TO TD | | | |
| Type Fluid in Hole | WATER | | | |
| Fluid Level | 393 | | | |
| Dens. / Visc. | - / - | | | |
| pH / Fluid Loss | - / - ml | ml | ml | ml |
| Source of Sample | MUDPIT | | | |
| $R_m$ @ Meas. Temp. | 3.52 @ 87°F | @ °F | @ °F | @ °F |
| $R_{mf}$ @ Meas. Temp. | - @ °F | @ °F | @ °F | @ °F |
| $R_{mc}$ @ Meas. Temp. | - @ °F | @ °F | @ °F | @ °F |
| Source: $R_{mf}$ / $R_{mc}$ | | | | |
| $R_m$ @ BHT | 2.42 @ 127°F | @ °F | @ °F | @ °F |
| Time Since Circ. | 2 DAYS | | | |
| Max. Rec. Temp. | 127 °F | °F | °F | °F |
| Equip. / Location | 5639 / VRNL | | | |
| Recorded By | ED MIXA | | | |
| Witnessed By | BERKHEISER | | | |

SWS 1383 H

FOLD HERE

The well name, location and borehole reference data were furnished by the customer.

## CHANGES IN MUD TYPE OR ADDITIONAL SAMPLES

| | | | | |
|---|---|---|---|---|
| Date / Sample No. | | | | |
| Depth - Driller | | | | |
| Type Fluid in Hole | | | | |
| Dens. / Visc. | | | | |
| ph / Fluid Loss | | ml | | ml |
| Source of Sample | | | | |
| $R_m$ @ Meas. Temp. | @ °F | @ °F | @ °F | @ °F |
| $R_{mf}$ @ Meas. Temp. | @ °F | @ °F | @ °F | @ °F |
| $R_{mc}$ @ Meas. Temp. | @ °F | @ °F | @ °F | @ °F |
| Source: $R_{mf}$ / $R_{mc}$ | | | | |
| $R_m$ @ BHT | @ °F | @ °F | @ °F | @ °F |
| $R_{mf}$ @ BHT | @ °F | @ °F | @ °F | @ °F |
| $R_{mc}$ @ BHT | @ °F | @ °F | @ °F | @ °F |

## SCALE CHANGES

| Type Log | Depth | Scale Up Hole | Scale Down Hole |
|---|---|---|---|
| | | | |

## EQUIPMENT DATA

| | |
|---|---|
| Run No. | ONE |
| Sonic Panel No. | JH-173 |
| Sonic Cart No. | EA-253 |
| Sonic Sonde No. | KB 45 |
| Mem. Panel No. | B-265 |
| G.R. Cart. No. | E-63 |
| G.R. Panel No. | EA-299 |
| Caliper No | D-1269 |
| TTR No. | - |
| Cent. Device | NONE |
| Stand off - Inches | 0 |
| Time Const. - Sec. | 2 |
| Speed - F.P.M. | 30 |

## REMARKS

Service Order No. - 2995

## CALIBRATION DATA

CALIBRATION BACKGND SOURCE GALV. INCR. SENS. TAP SENS. TAP TIME

CALIBRATION DATA

| CALIBRATION: | BACKGND. CPS. | SOURCE CPS. | GALV. INCR. DIVISION | SENS. TAP (FOR CAL.) | SENS. TAP (RECORD) | TIME CONST. |
|---|---|---|---|---|---|---|
| GAMMA RAY: | 80 | 500 | 100 | 0-200 | 0-200 | 2 |

All interpretations are opinions based on inferences from electrical or other measurements and we cannot, and do not guarantee the accuracy or correctness of any interpretations, and we shall not, except in the case of gross or willful negligence on our part, be liable or responsible for any loss, costs, damages or expenses incurred or sustained by anyone resulting from any interpretation made by any of our officers, agents or employees. These interpretations are also subject to Clause 7 of our General Terms and Conditions as set out in our current Price Schedule.

## GAMMA RAY
API UNITS

0 — 200

200 — 400

## CALIPER
HOLE DIAM. IN INCHES

+ — 14"

DEPTHS

## INTERVAL TRANSIT TIME
MICROSECONDS PER FOOT

T 3 $R_1$ 2 $R_2$

150 — 100 — 50

200 — 150

0100

0200

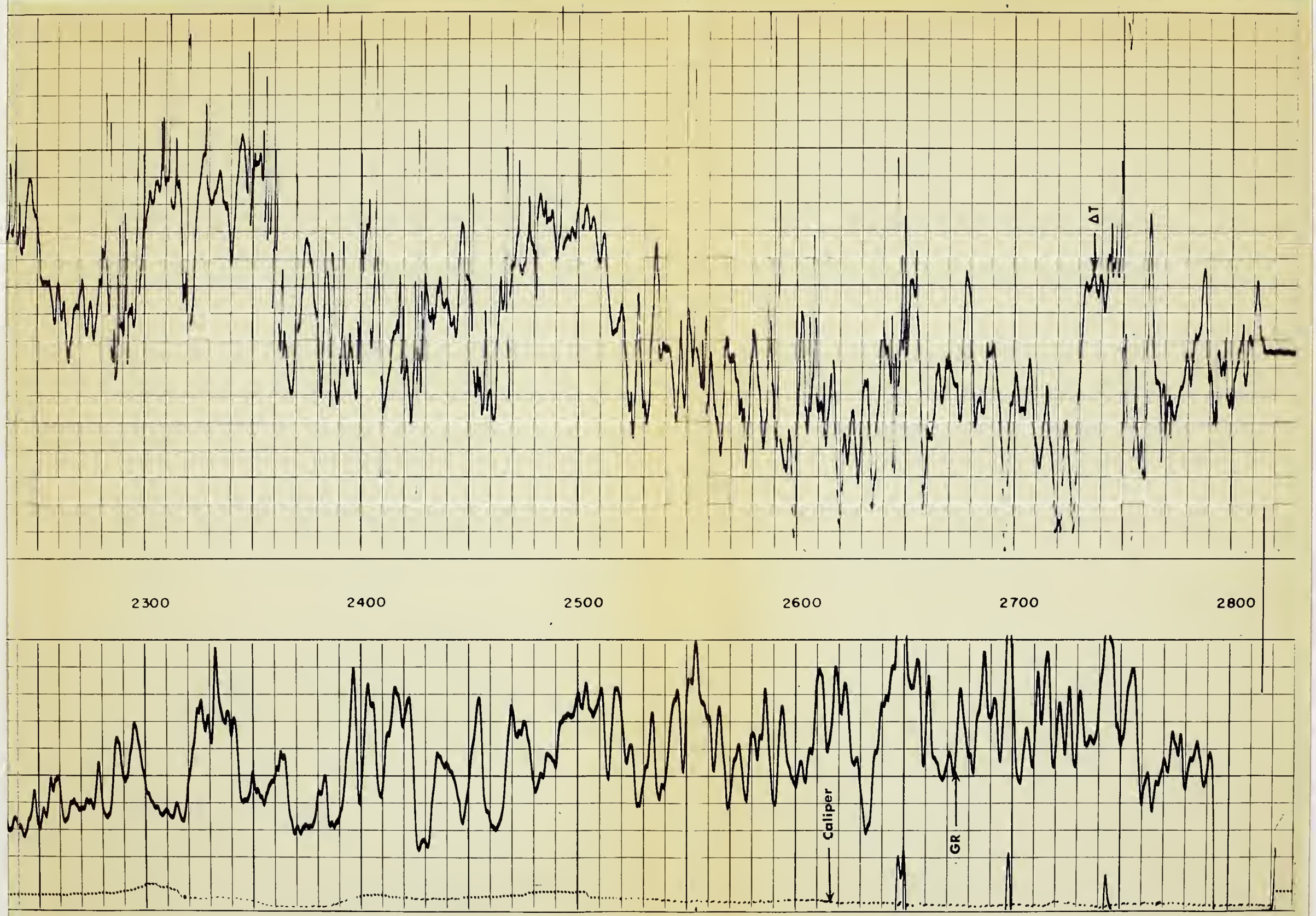
0300

FLUID LEVEL

0400 0500 0600 0700 0800 0900

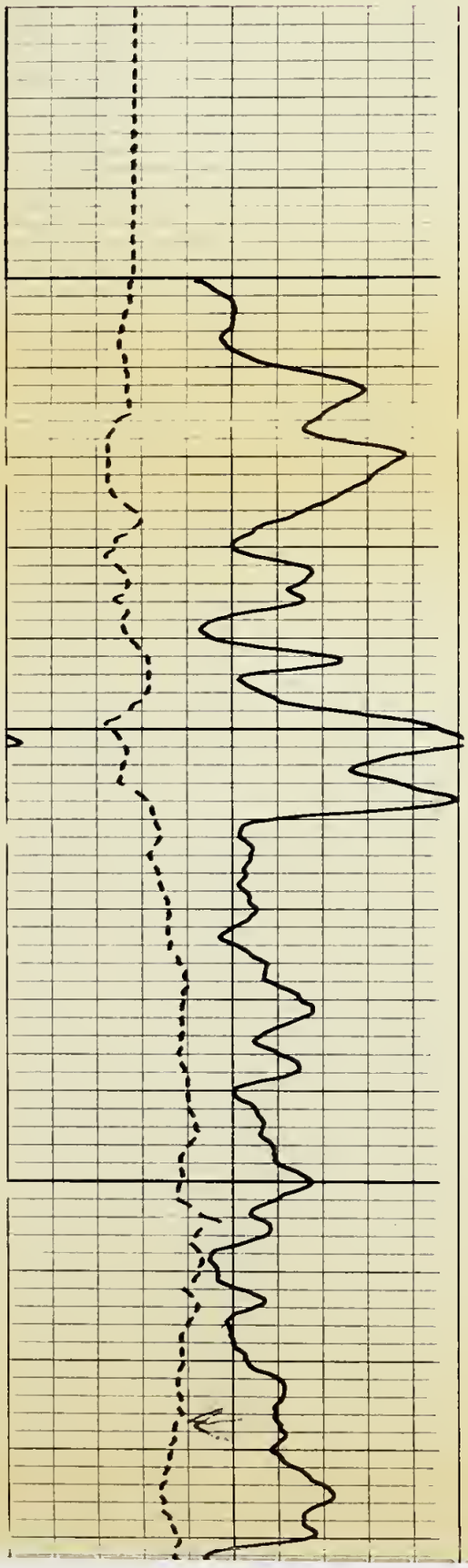
1000 1100 1200 1300 1400 1500 1600

1700 1800 1900 2000 2100 2200


ΔT
2300
2400
2500
2600
2700
2800
Caliper
GR

5"=100'

| GAMMA RAY<br>API UNITS | DEPTHS | INTERVAL TRANSIT TIME<br>MICROSECONDS PER FOOT |
|---|---|---|
| 0 — 200<br>200 — 400 | | T 3 $R_1$ 2 $R_2$<br>150 — 100 — 50<br>200 — 150 |
| **CALIPER**<br>HOLE DIAM. IN INCHES | | |
| 4" — 14" | | |



0100

CALIBRATION AFTER SURVEY

0200

0300

6

5

4

3

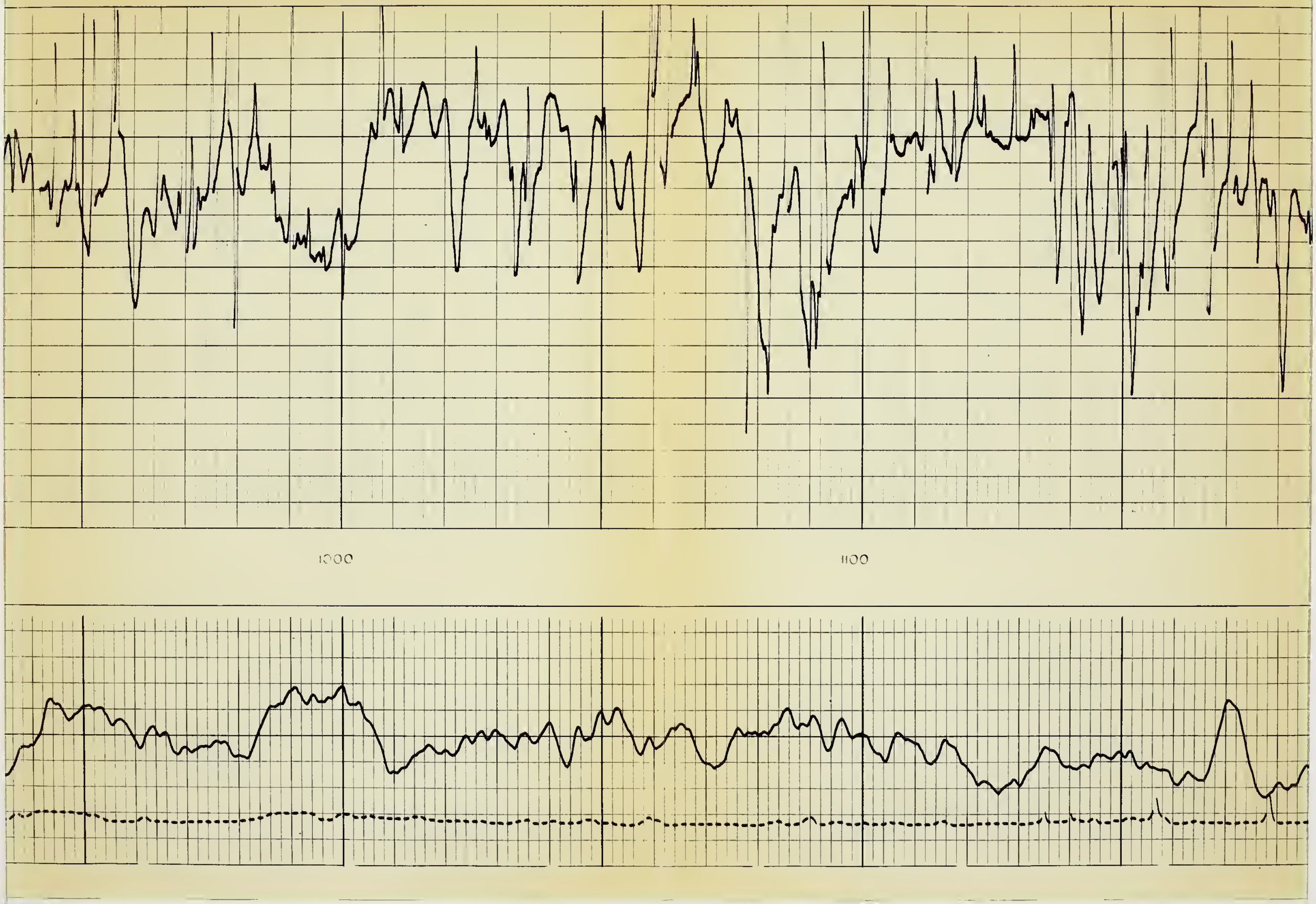
1

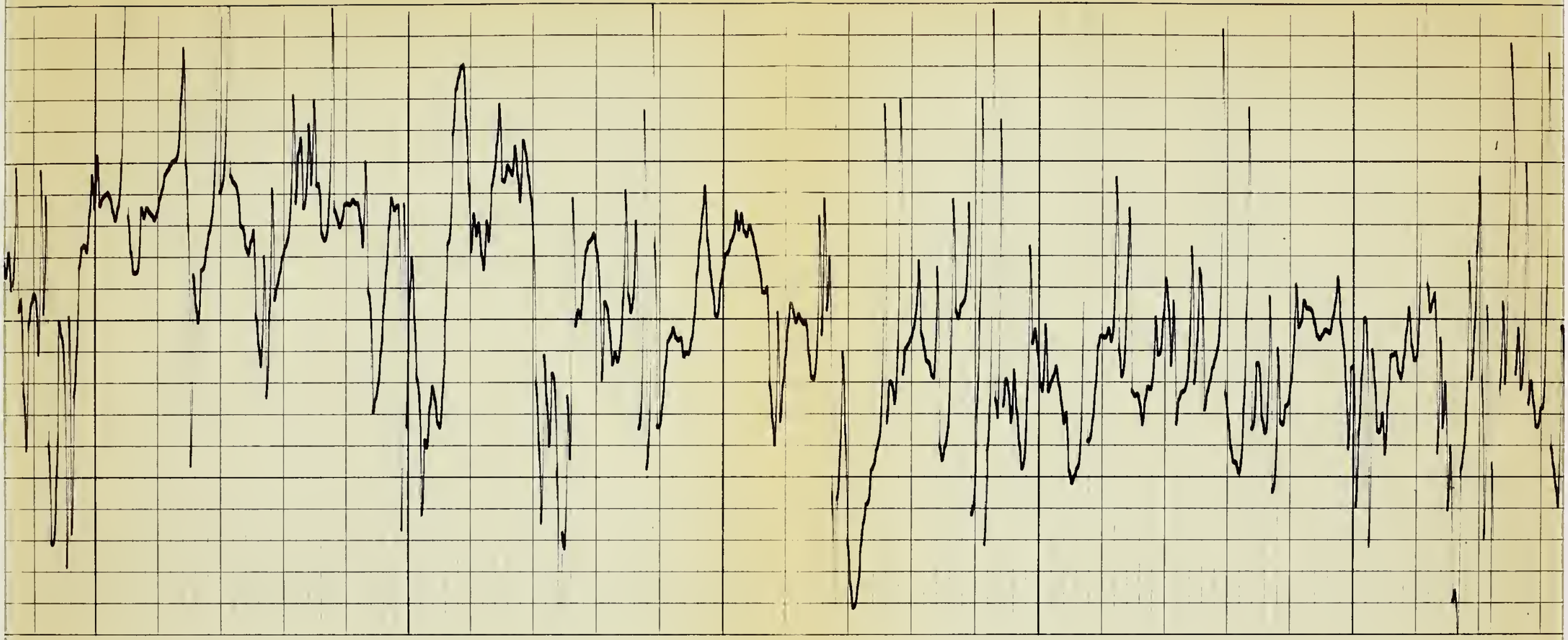
0400

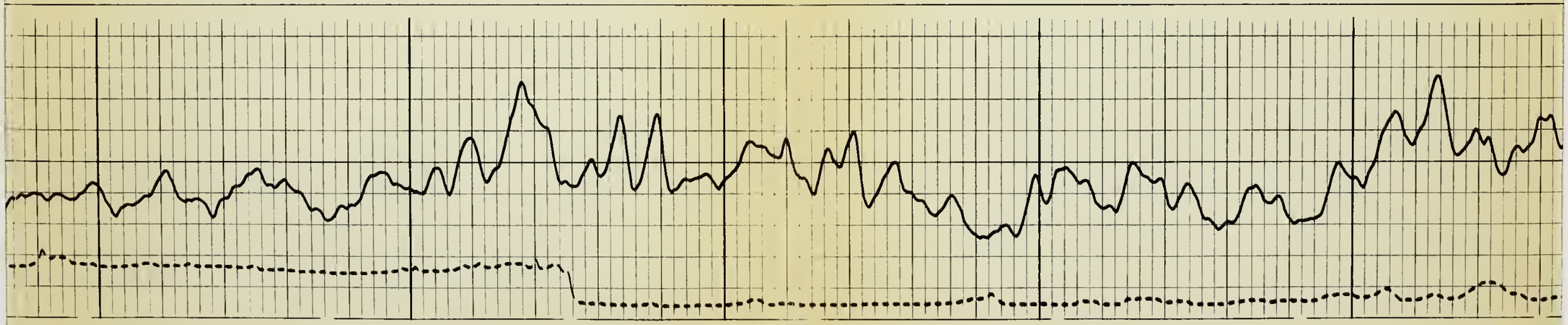
0500

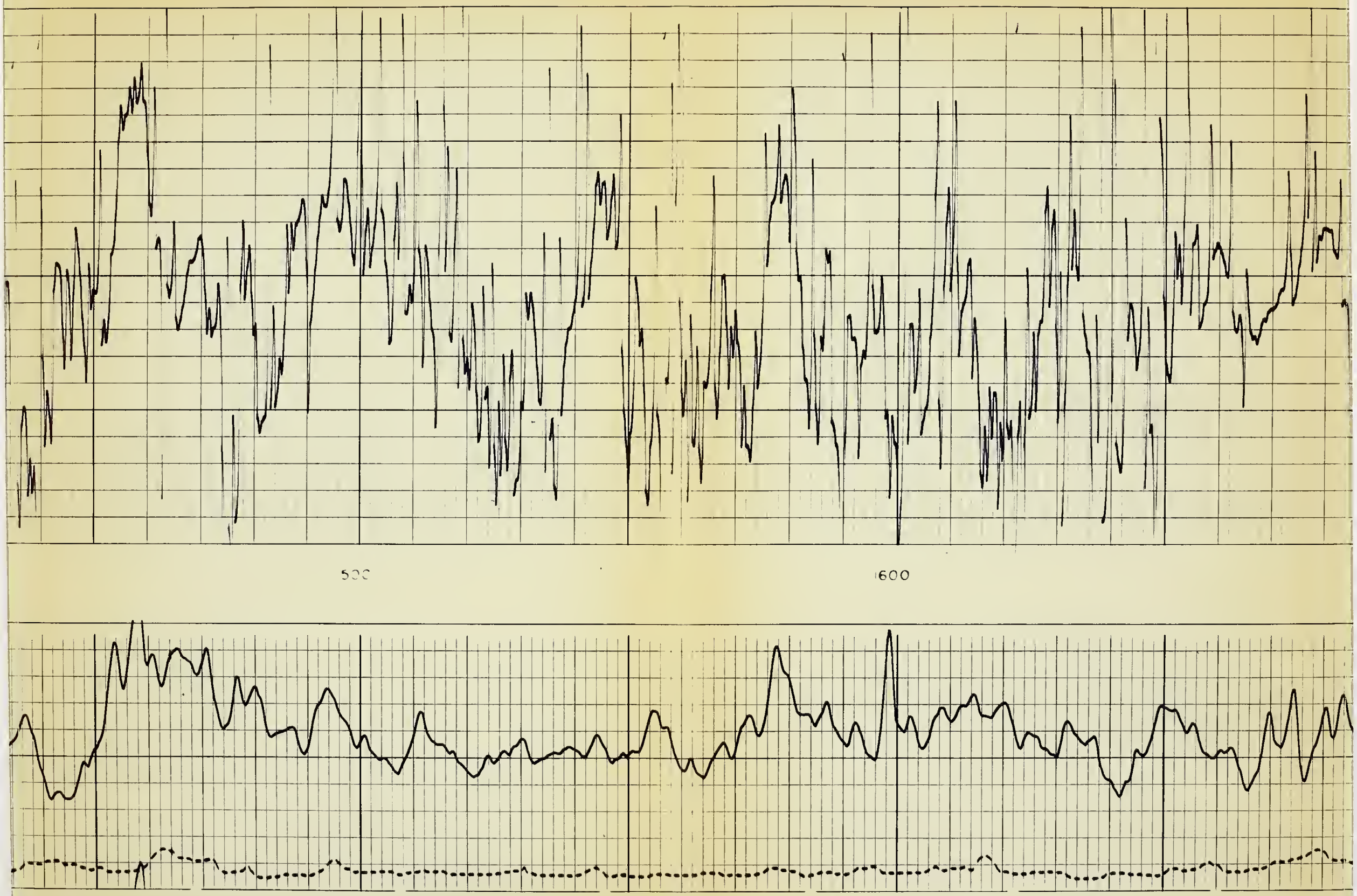
0600

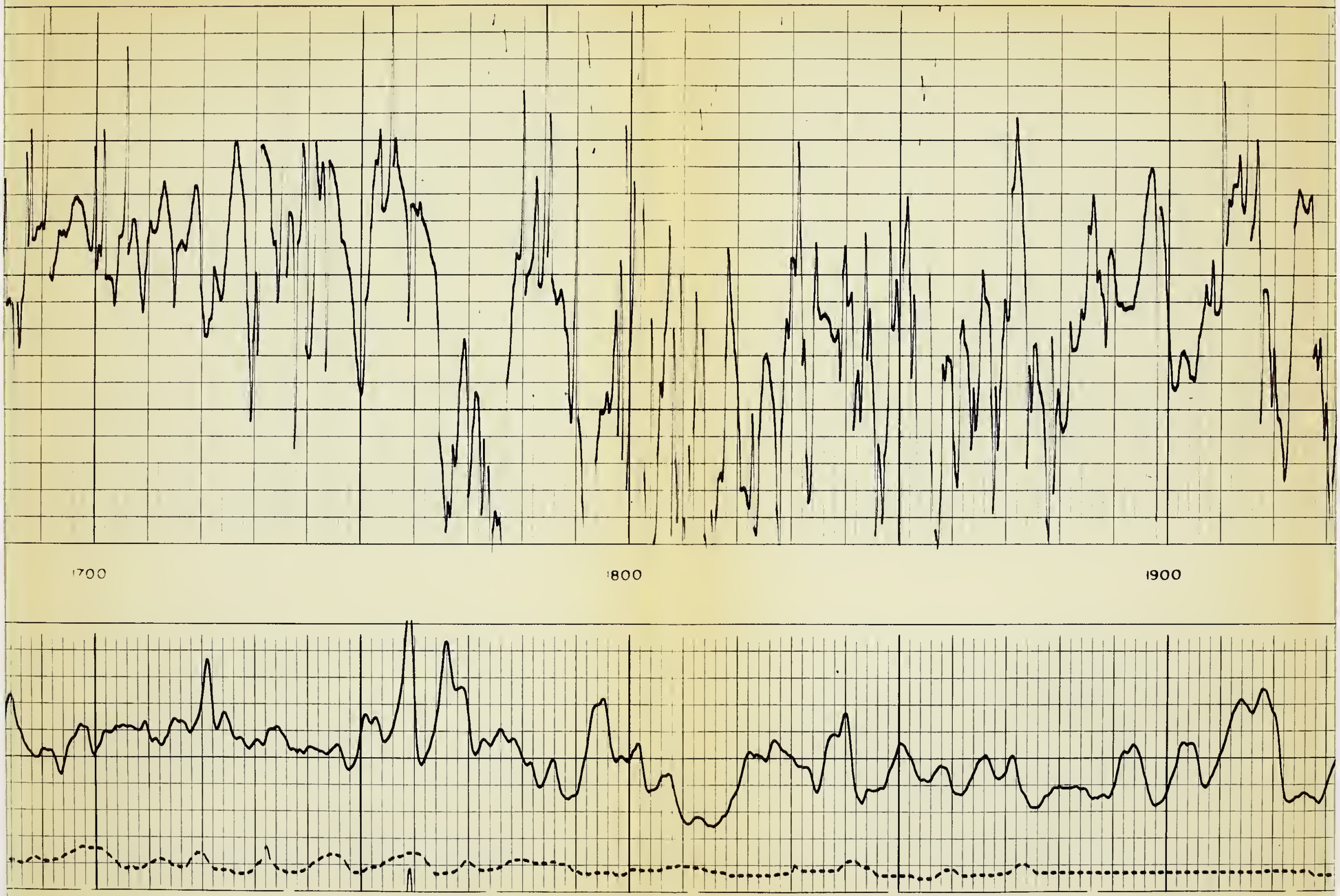
0700 0800 0900

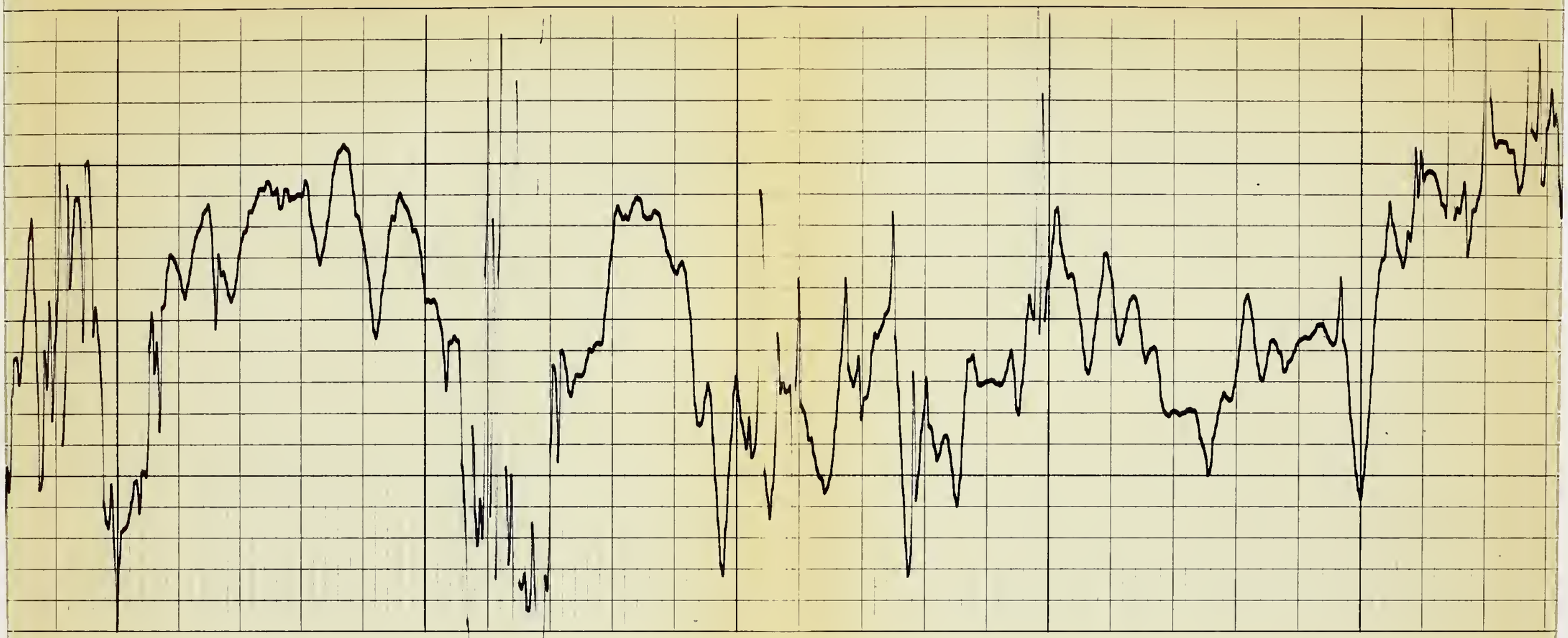

1000
1100

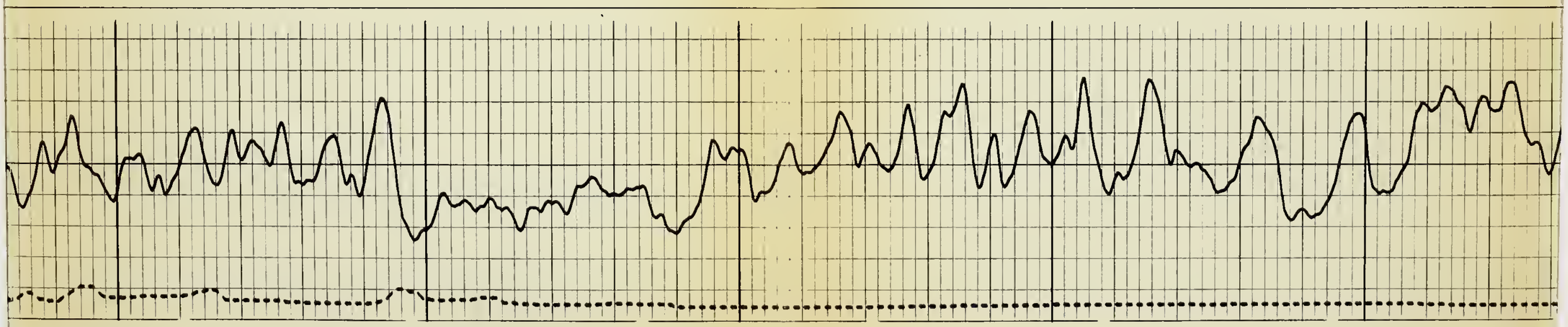

200
300

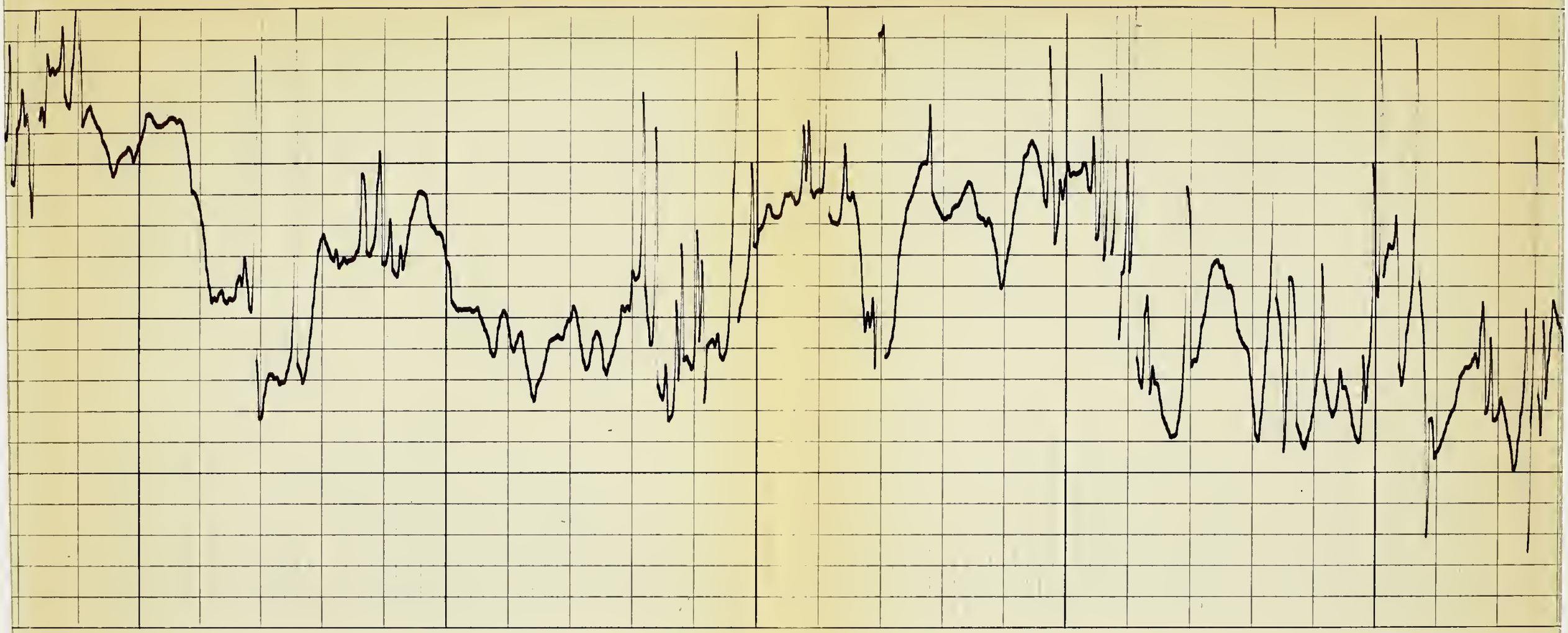


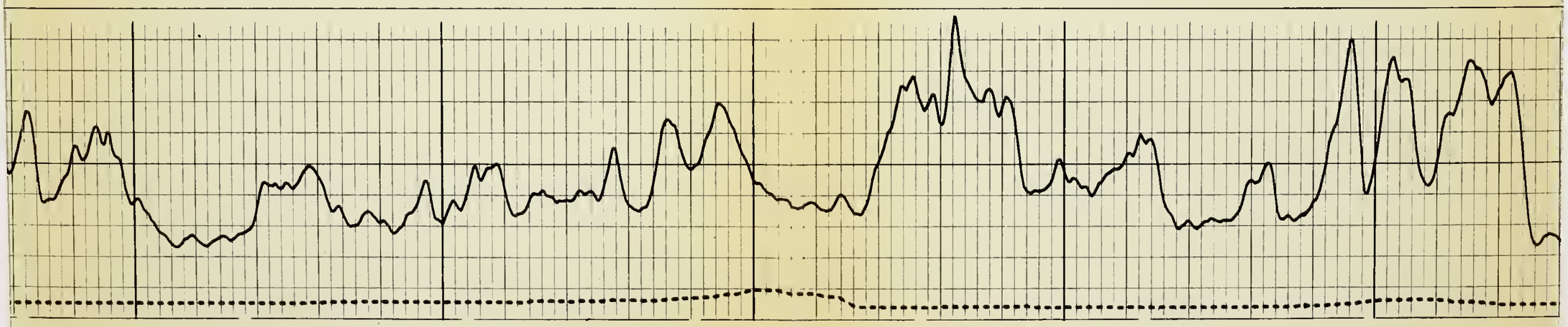

500
1600

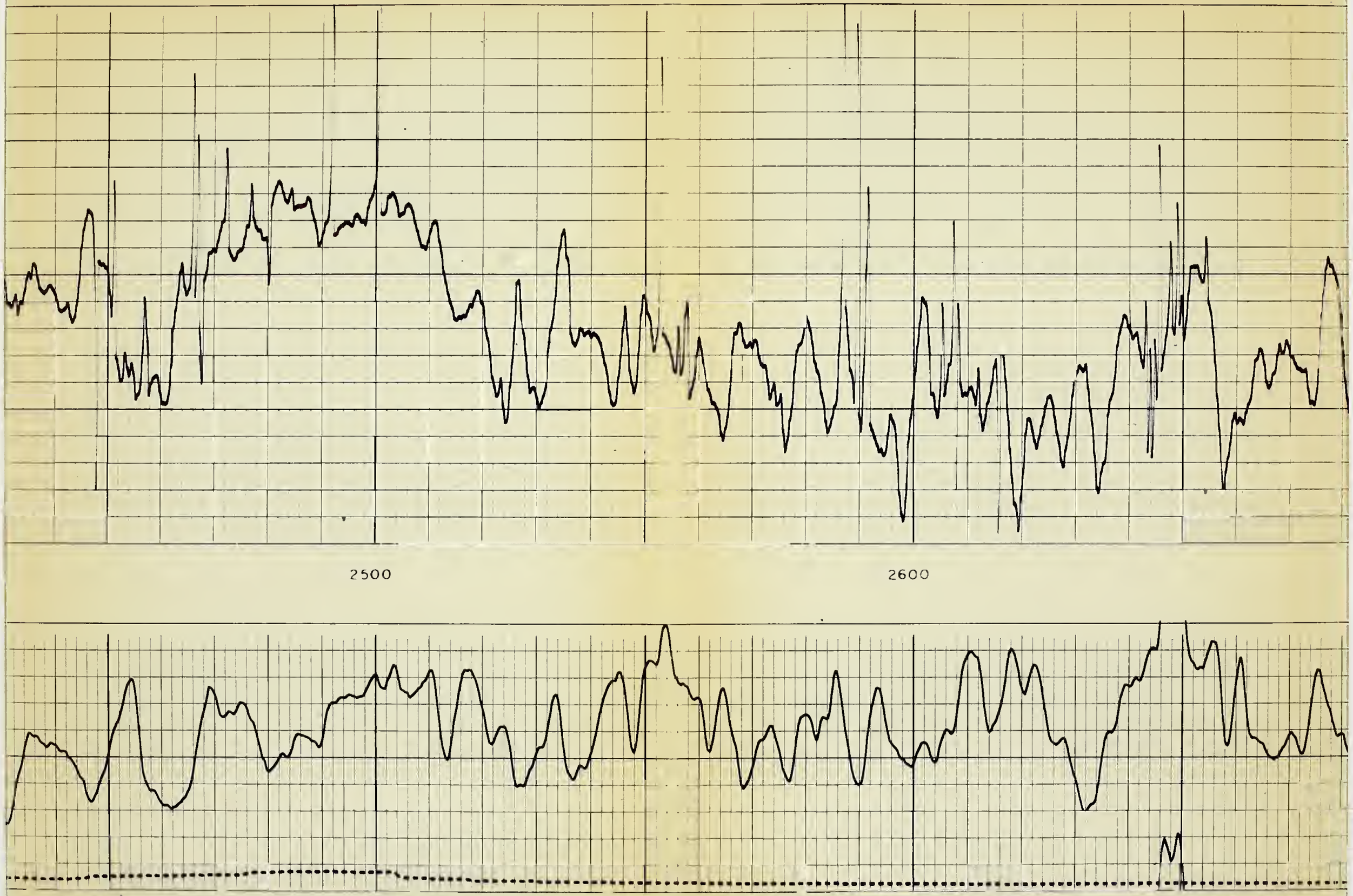

1700
1800
1900

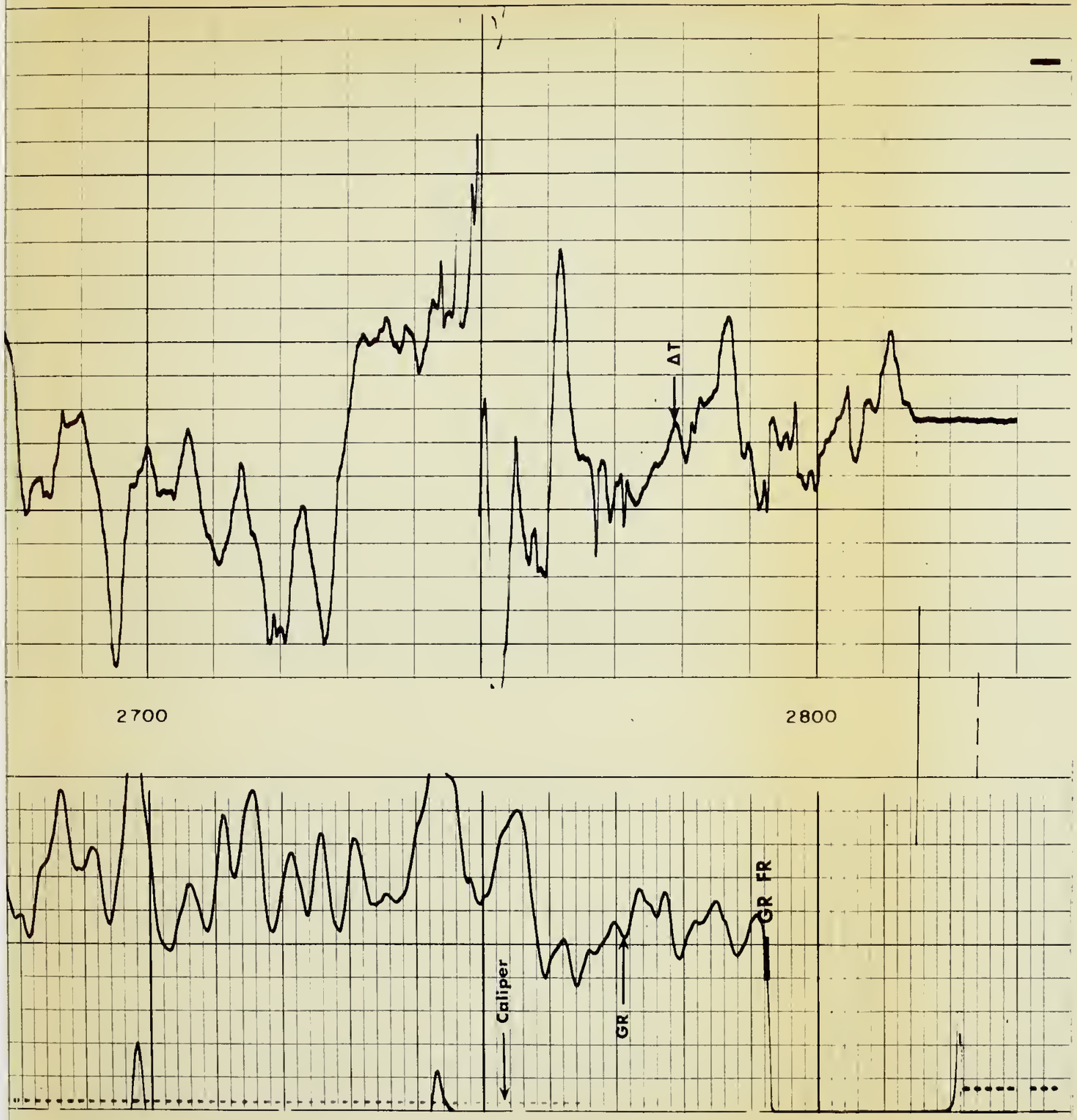

2000
2100

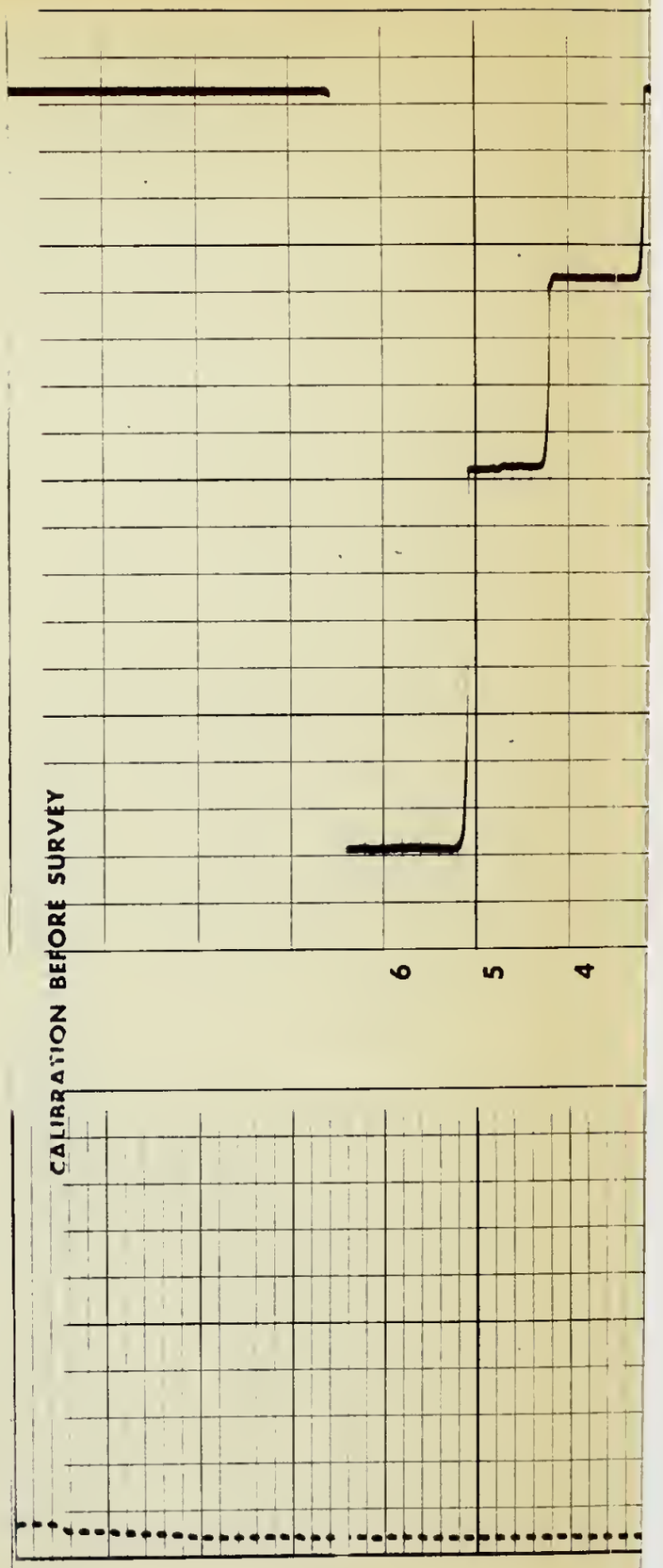



2200
2300
2400




2500
2600


ΔT
2700
2800
Caliper
GR
GR FR


CALIBRATION BEFORE SURVEY
6
5
4

REPEAT SECTION

3

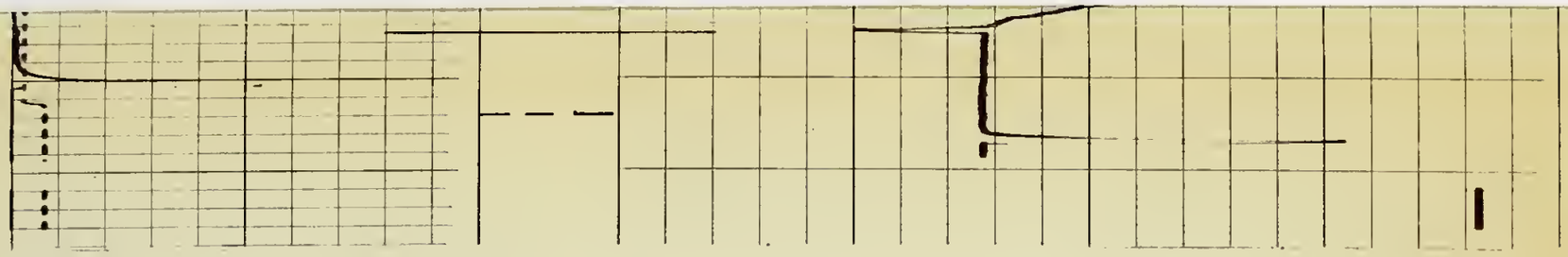
2600

MEMORIZER OUT — CURVES INVALID

2700

2800

GR FR



4" 14"

**CALIPER**
HOLE DIAM. IN INCHES

0 200
200 400

T 3 $R_1$ 2 $R_2$

150 100 50
200 150

**GAMMA RAY**
API UNITS

DEPTHS

**INTERVAL TRANSIT TIME**
MICROSECONDS PER FOOT

**GAMMA RAY** API UNITS
0 200
200 400

3' RECEIVER
AT

**AMPLITUDE** MILLIVOLTS
0 20

**VARIABLE DENSITY**
MICROSECONDS
200 1200
5'

480 280

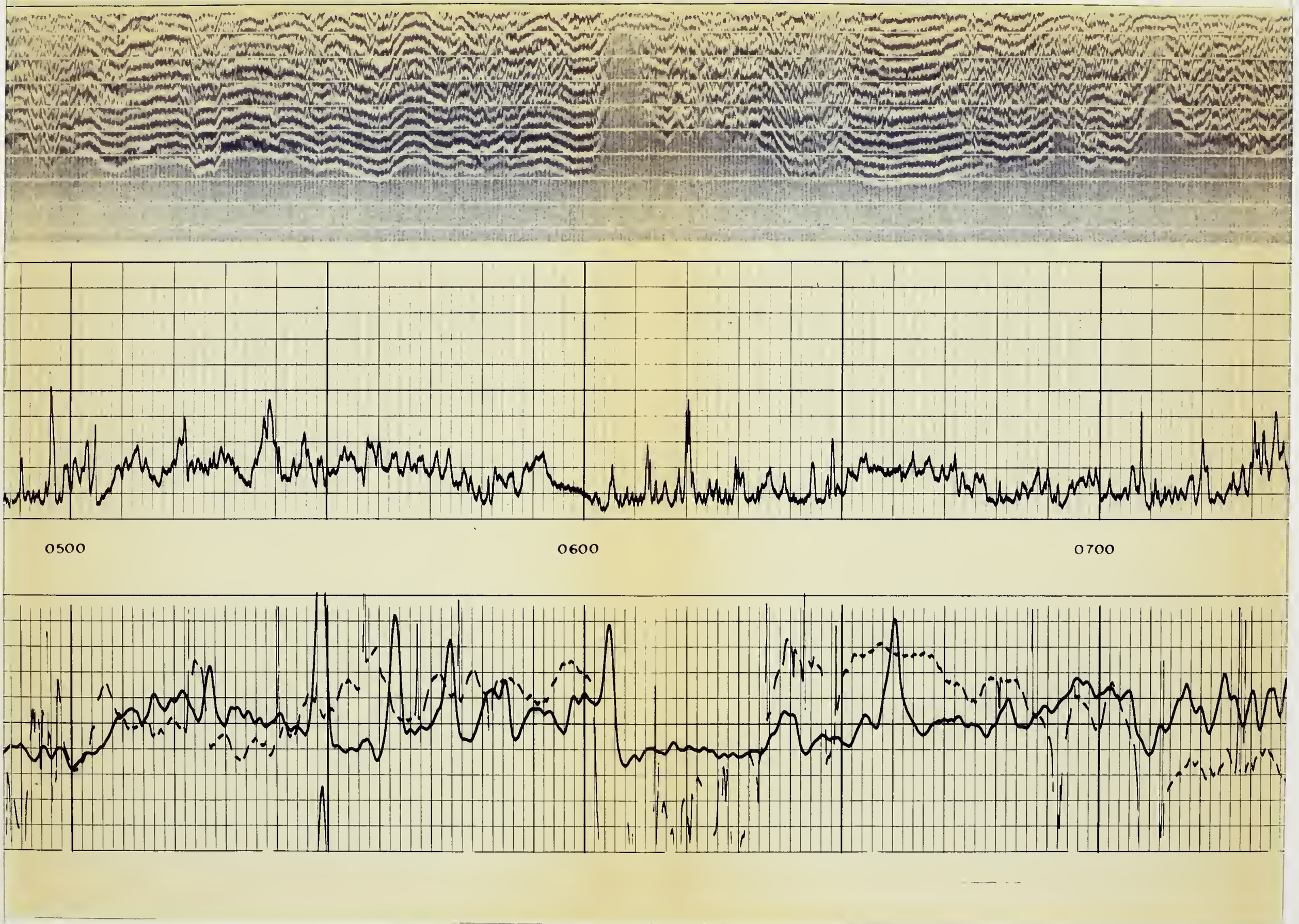
CUT

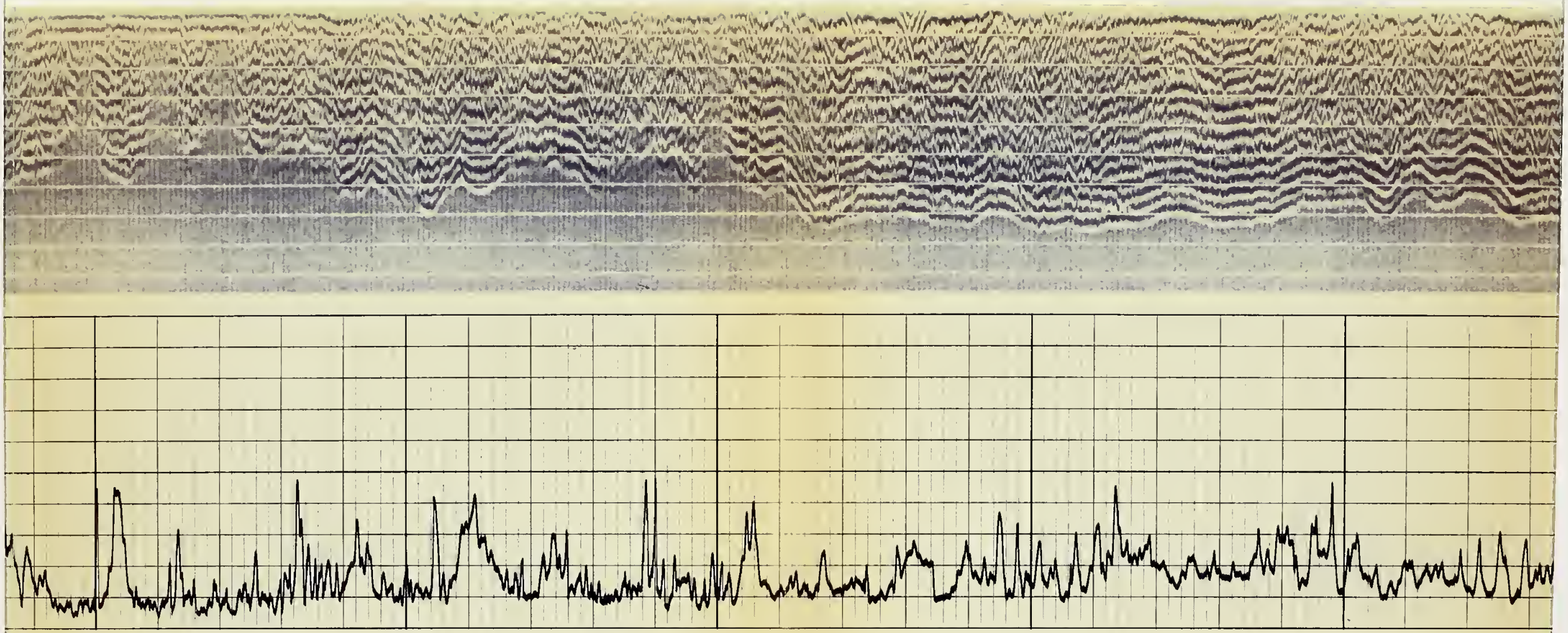
400

ΔT

GR

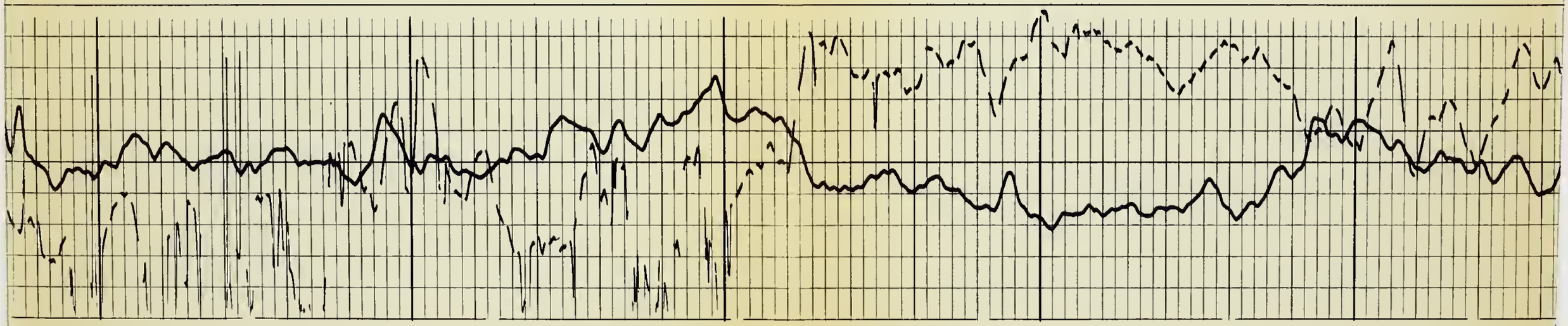
Amplitude Curve

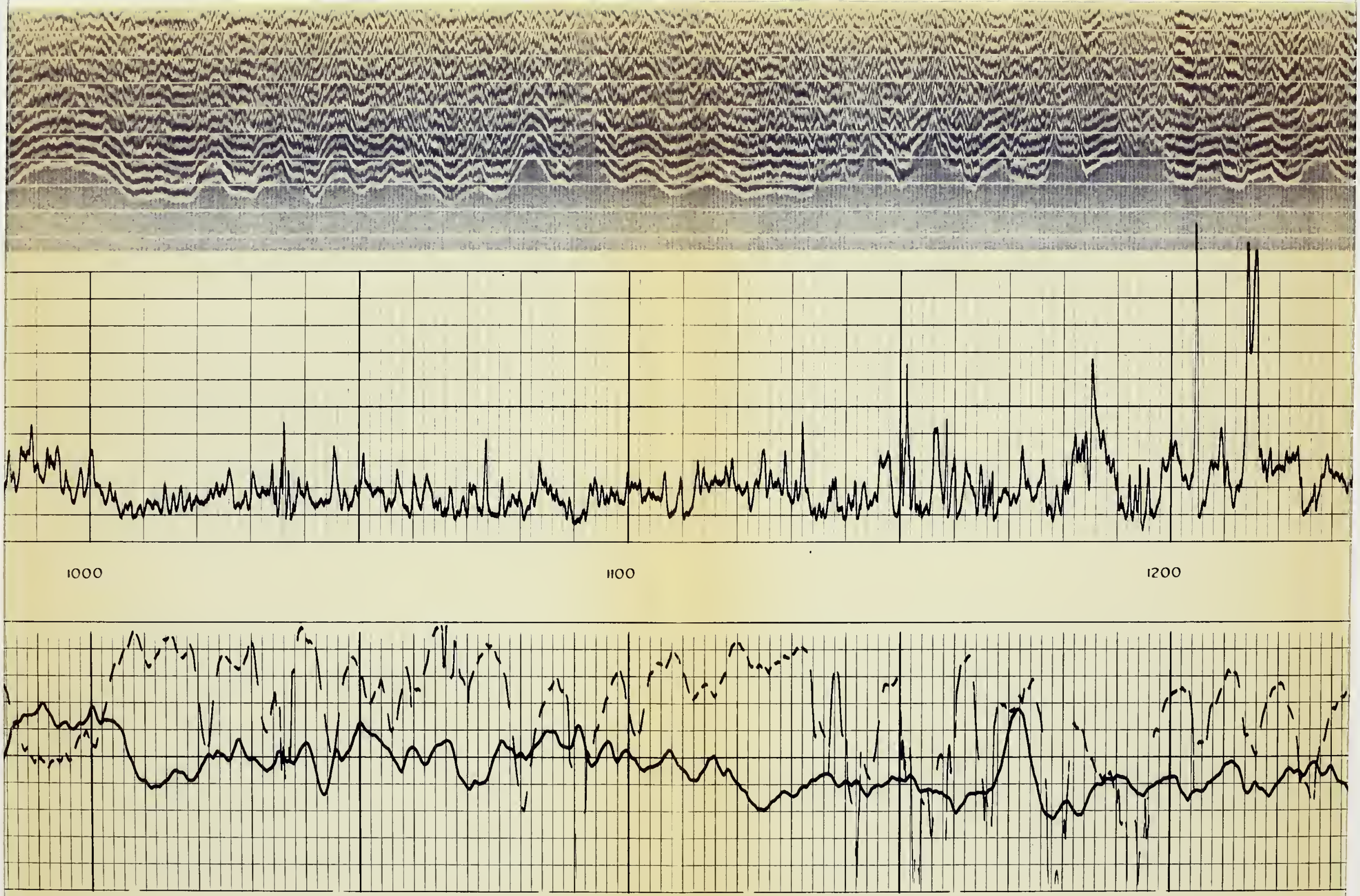

0500
0600
0700

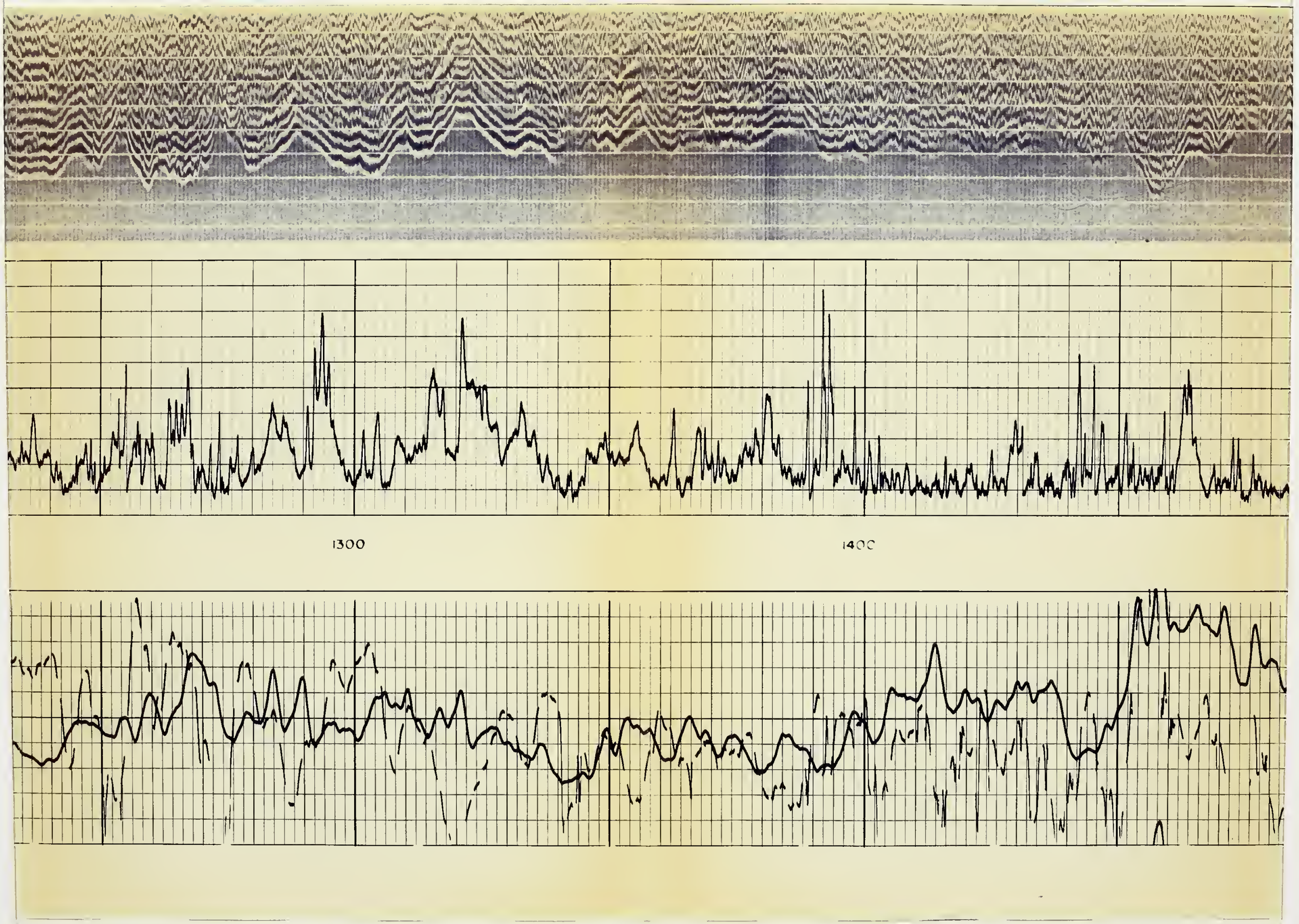


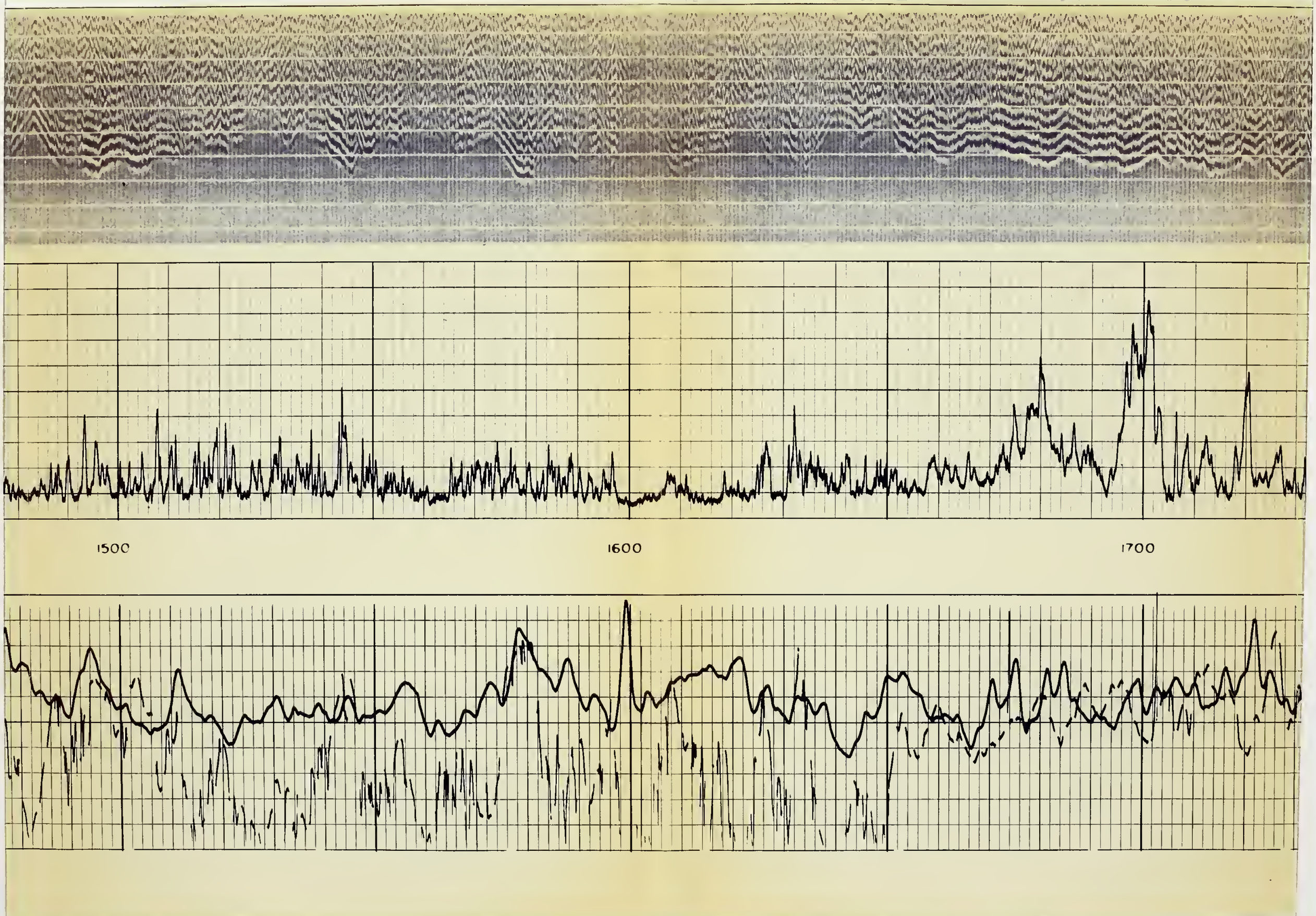
0800

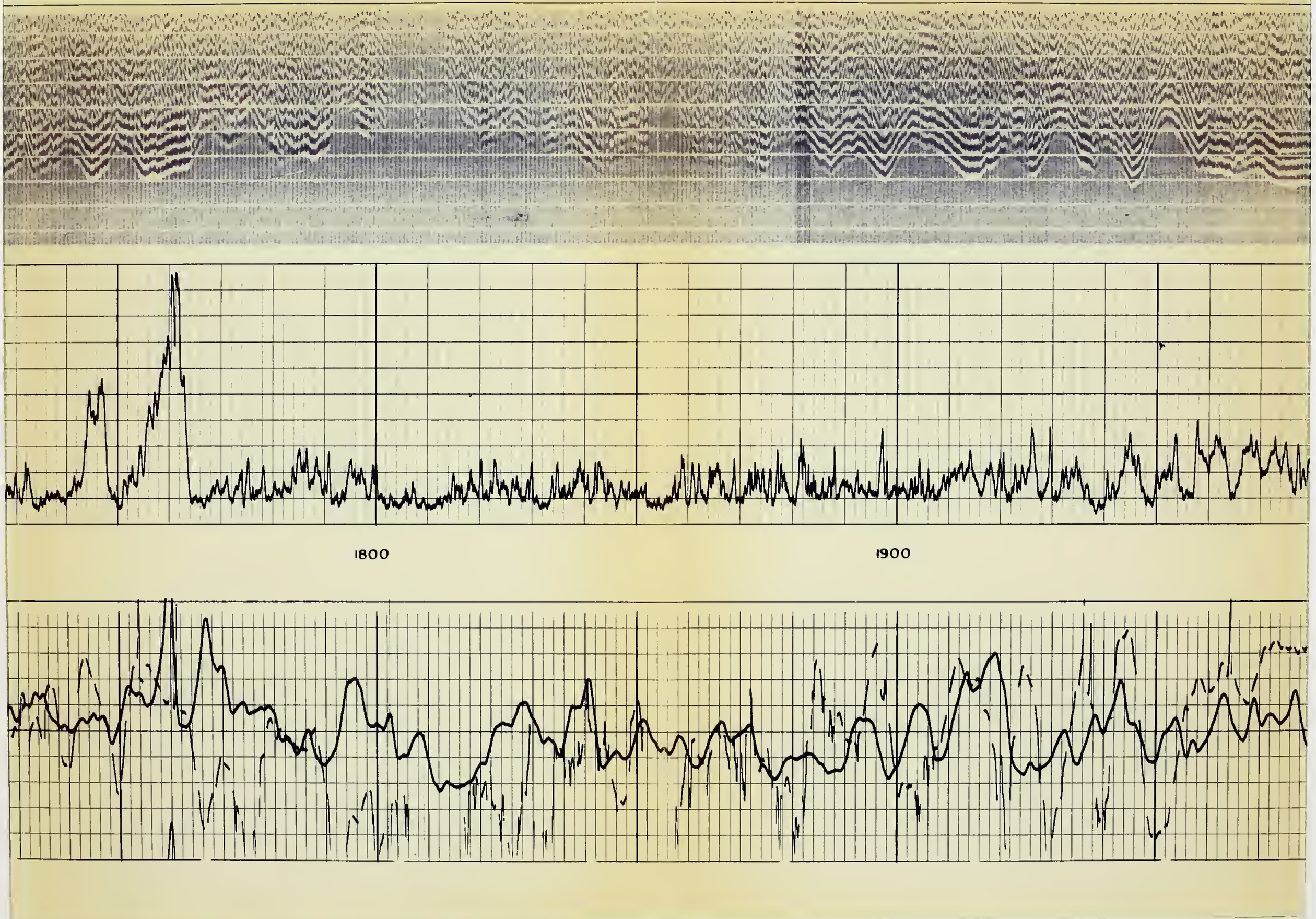
0900

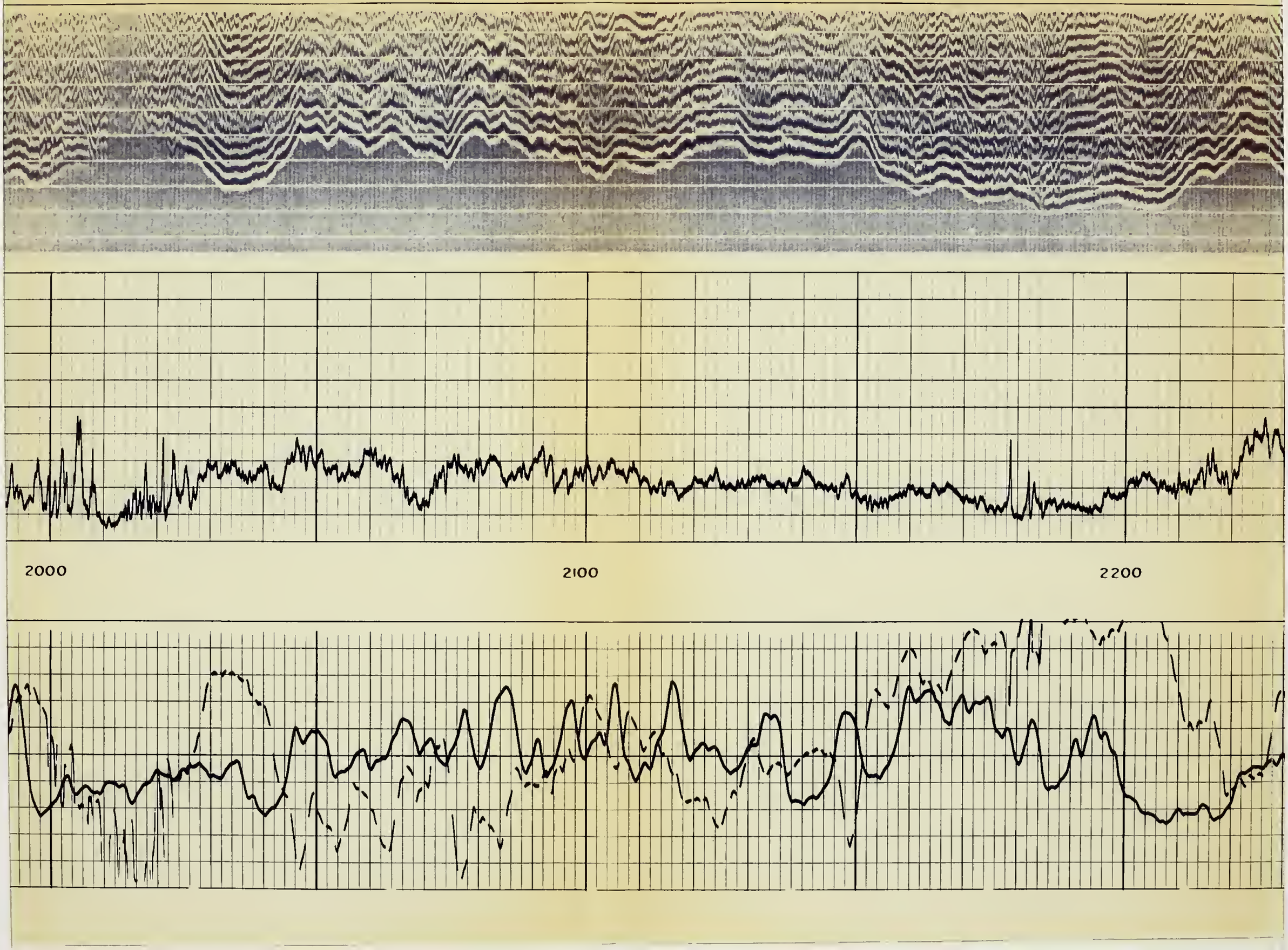


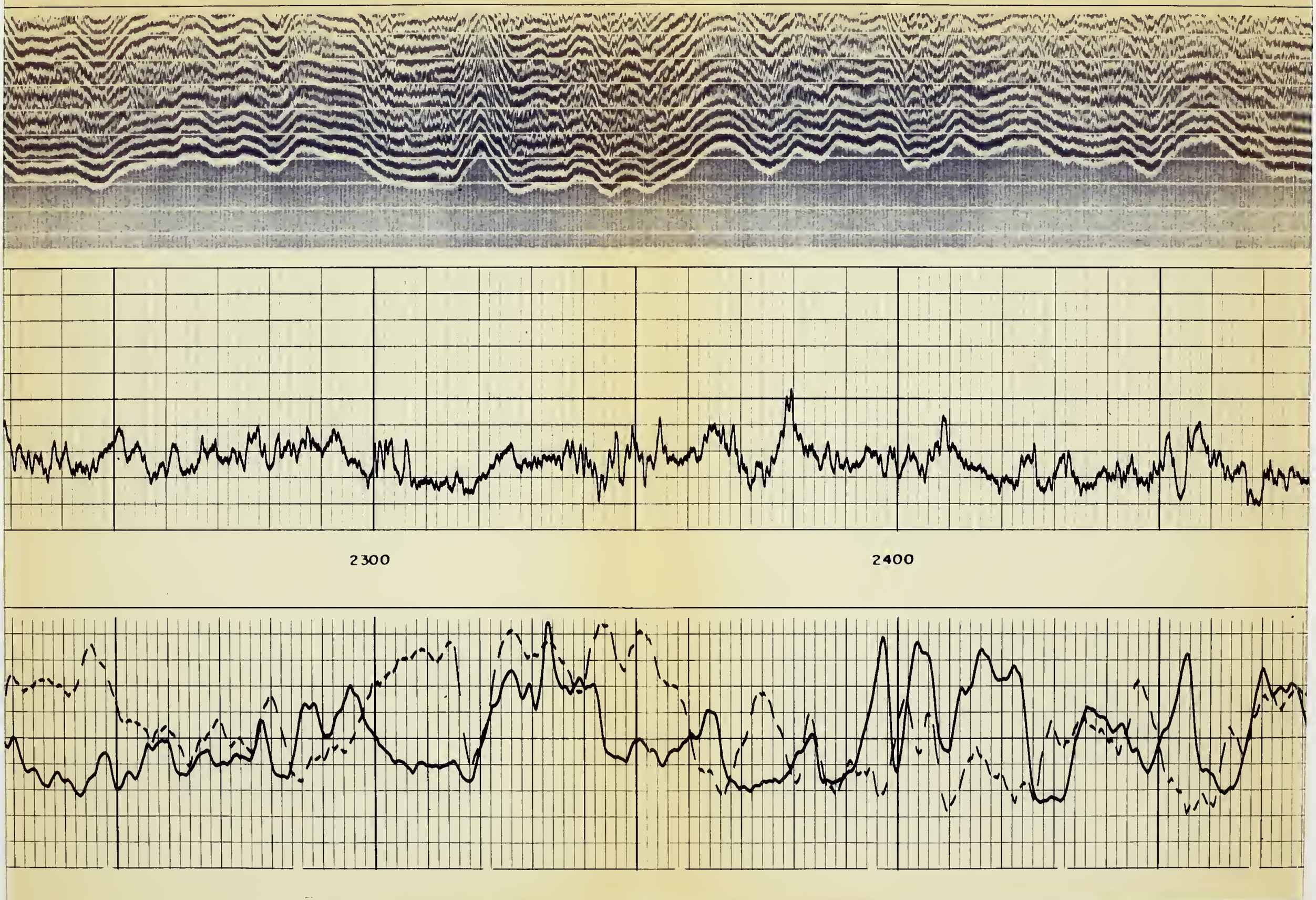

1000
1100
1200

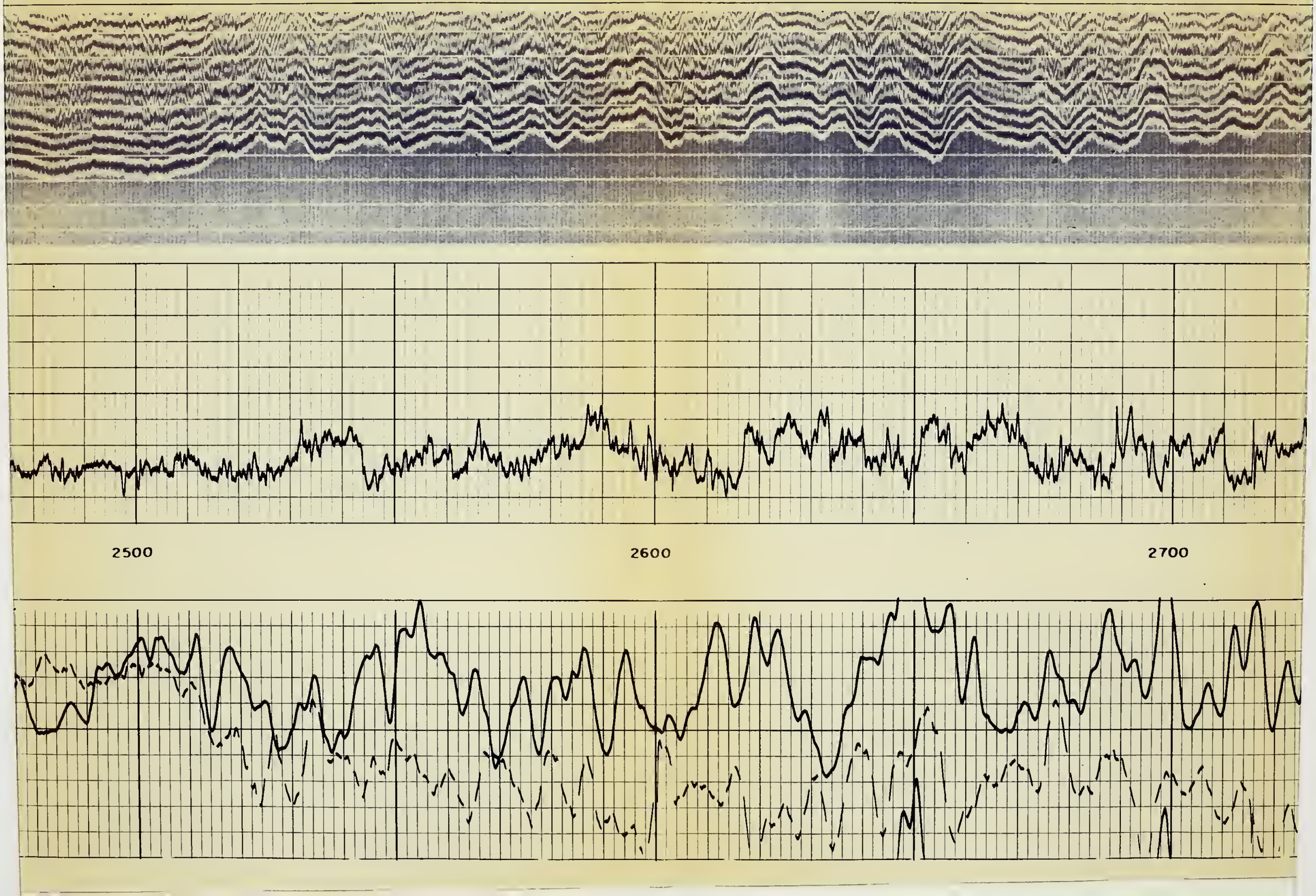

1300
1400

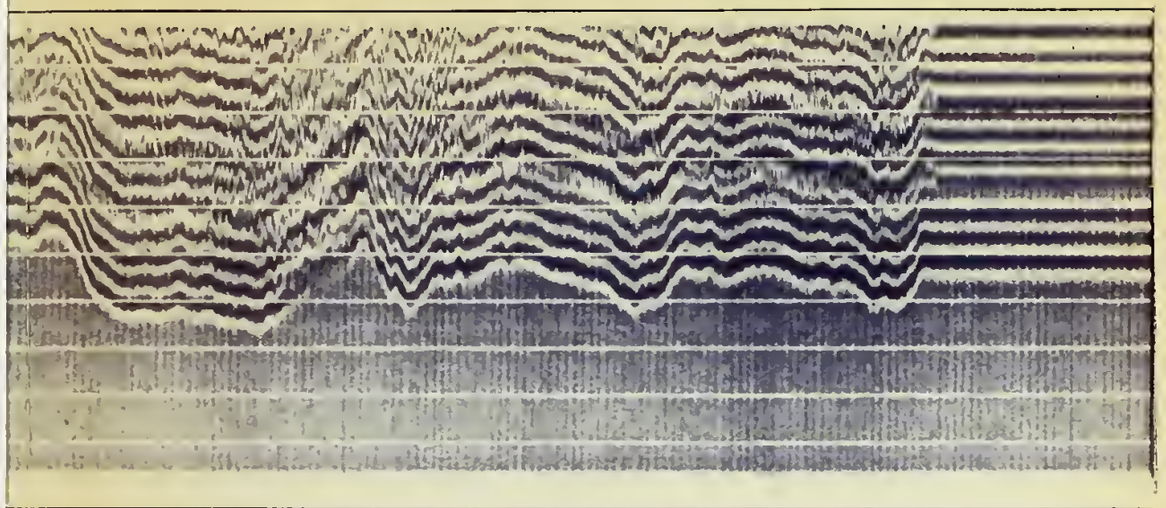

1500
1600
1700

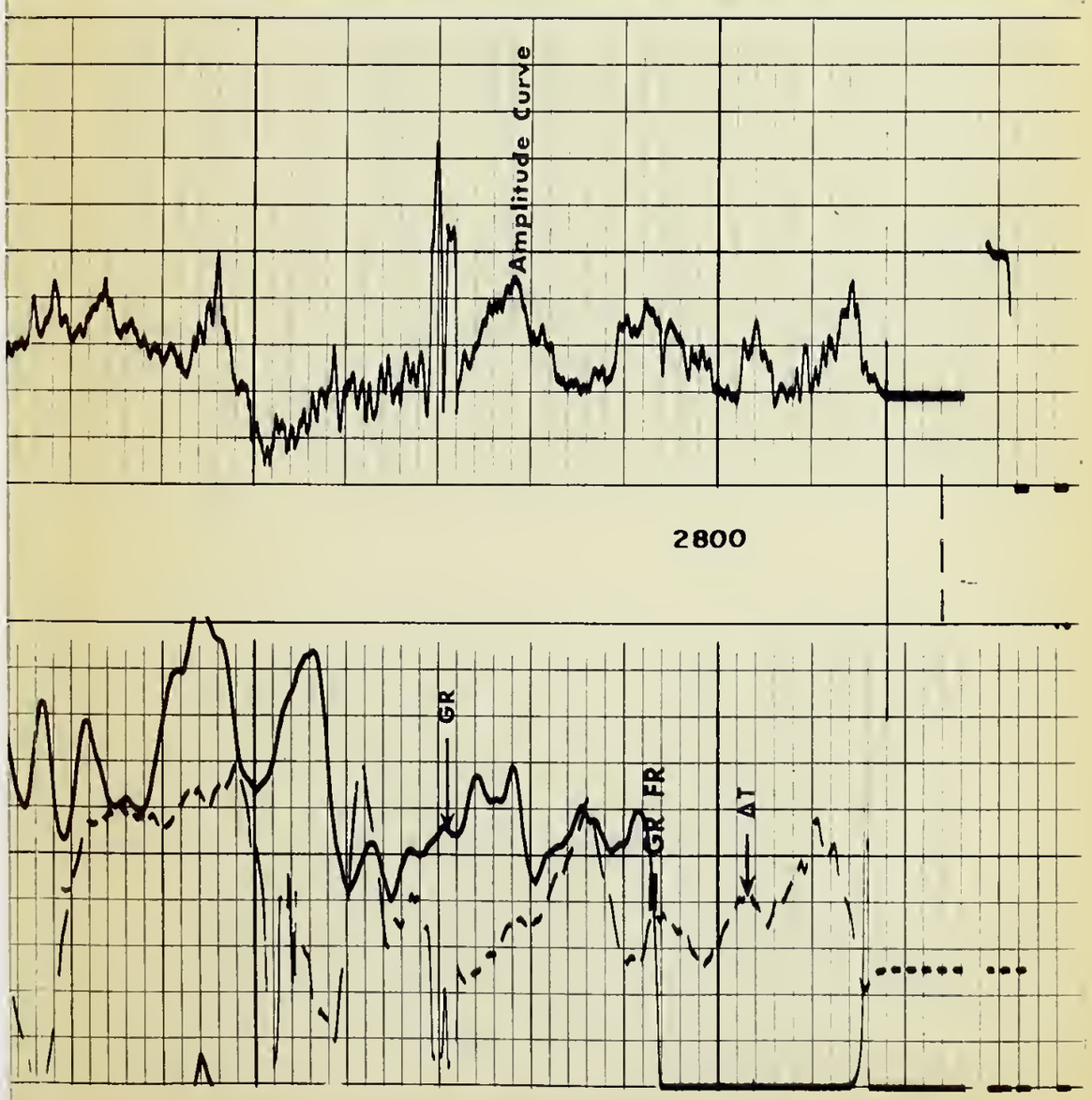

1800
1900

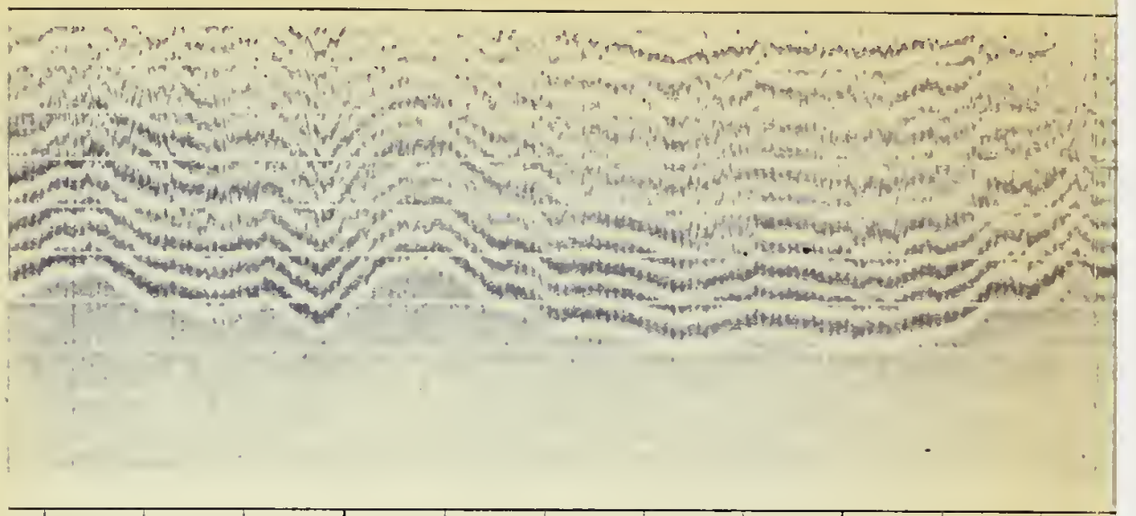

2000
2100
2200

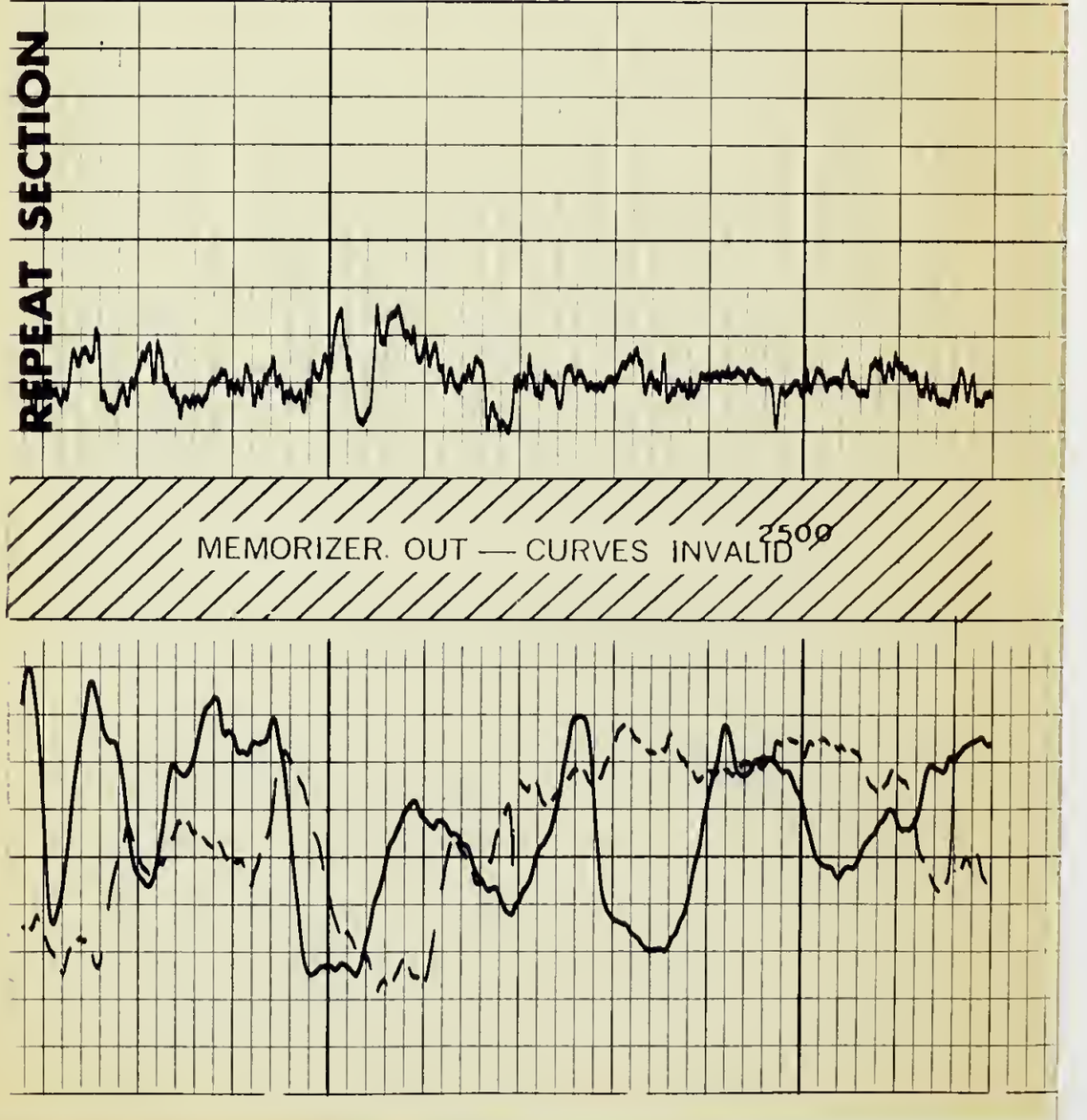

2300
2400

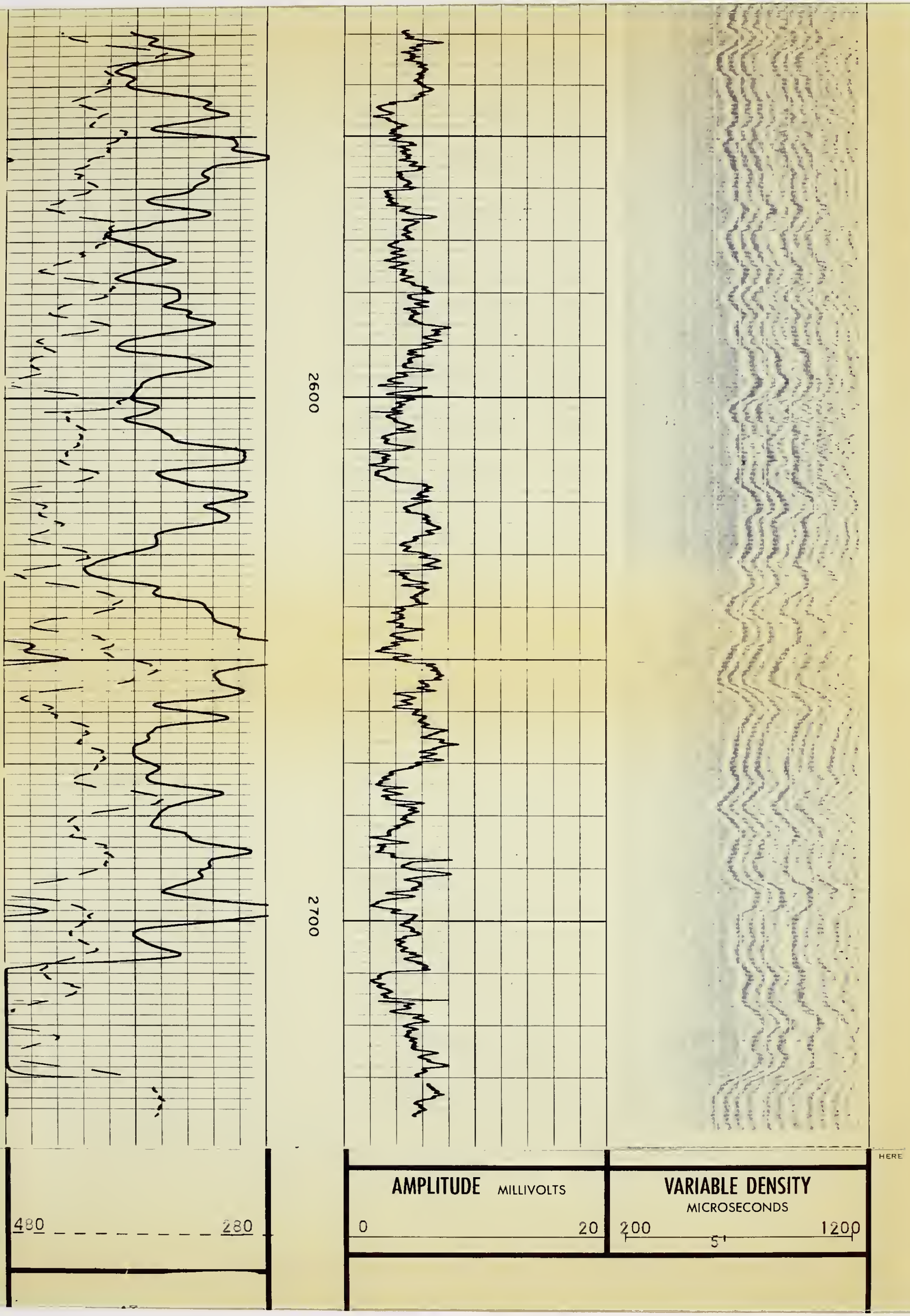

2500
2600
2700




Amplitude Curve
2800
GR
GR FR
ΔT




REPEAT SECTION
MEMORIZER. OUT — CURVES INVALID
2500


2600
2700
480
280
AMPLITUDE MILLIVOLTS
0
20
VARIABLE DENSITY
MICROSECONDS
200
1200
5"
HERE

AT
3' RECEIVER

**GAMMA RAY** API UNITS

| | |
|---|---|
| 0 | 200 |
| 200 | 400 |

COMPANY ATLANTIC RICHFIELD COMPANY

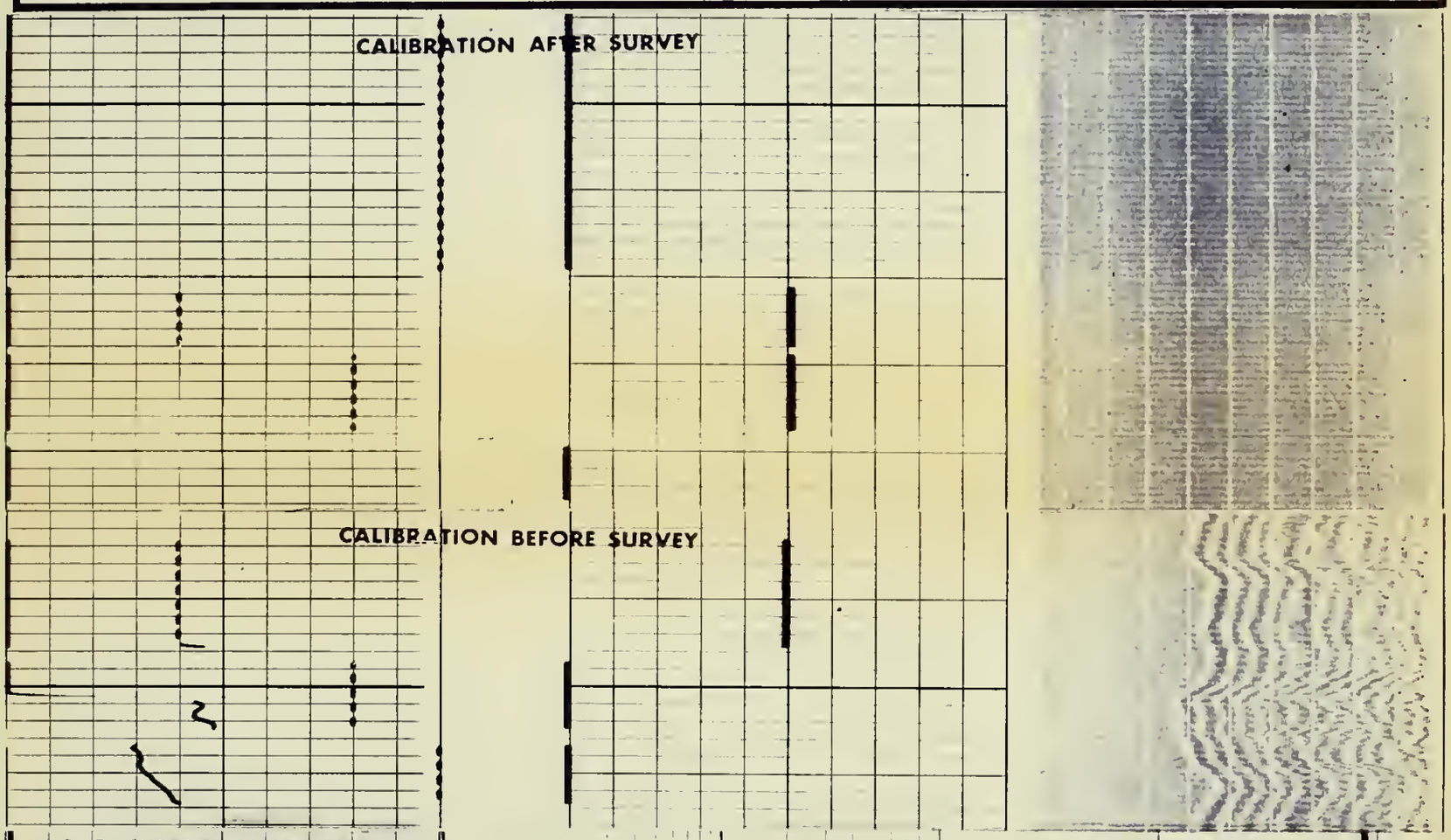
WELL SORGHUM GULCH #11

FIELD SORGHUM GULCH

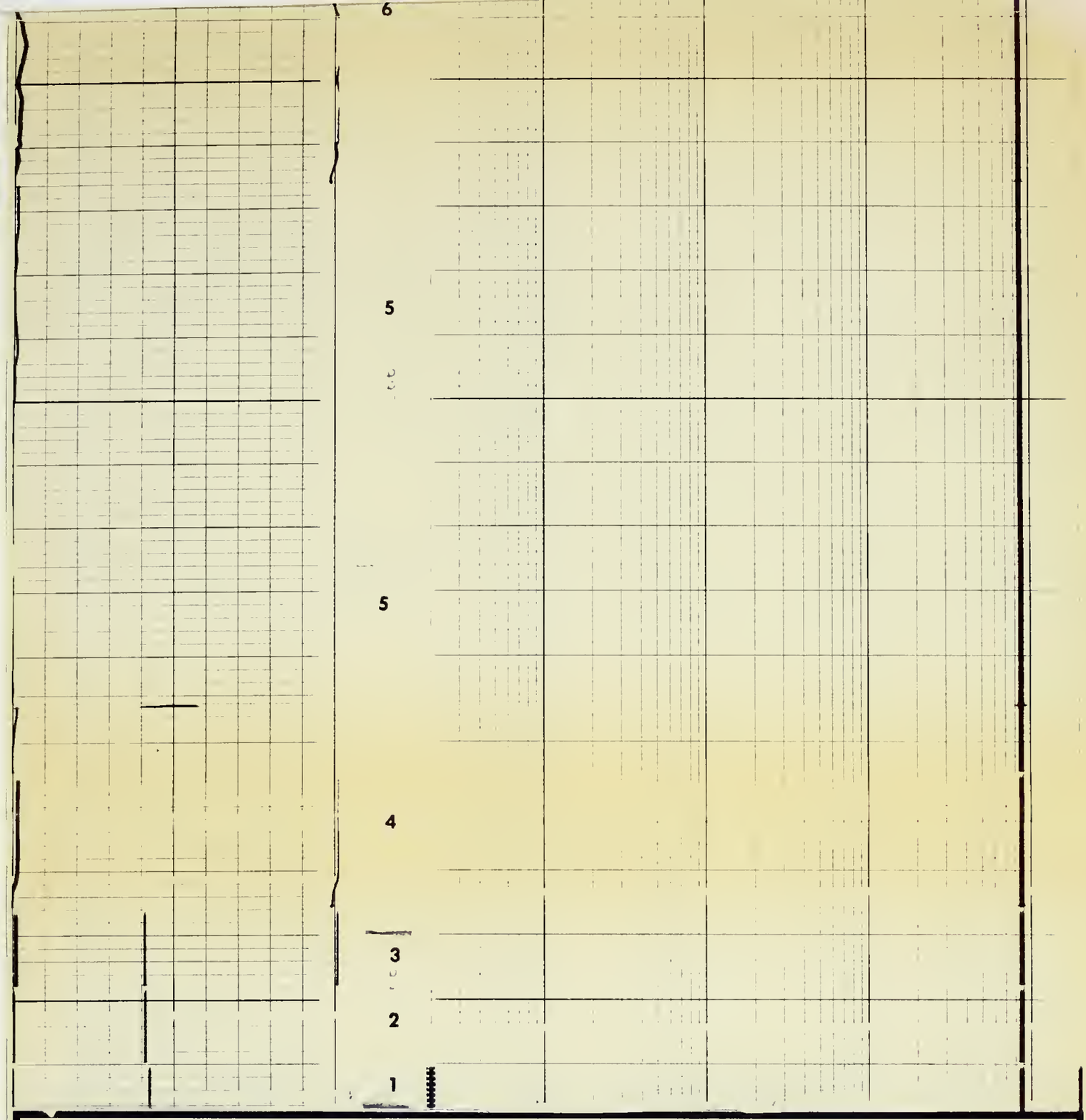
COUNTY RIO BLANCO STATE COLORADO

SCHL. FR 2815
SCHL. TD 2824
DRLR TD 2826
Elev:
KB -
DF -
GL 6900

## CALIBRATION RECORD




G. R. SURFACE CALIBRATION




## BOREHOLE COMPENSATED SONIC CALIBRATION CODING

1. MECHANICAL ZERO
2. 40 μ SEC/FT
3. 60 μ SEC/FT
4. 80 μ SEC/FT
5. 100 μ SEC/FT
6. 140 μ SEC/FT

## GAMMA RAY CALIBRATION CODING

1. MECHANICAL ZERO
2. ELECTRICAL ZERO
3. RECORDER SENSITIVITY
4. MEMORIZER ADJUSTMENT
5. BACKGROUND
6. CALIBRATION

# CALIBRATION RECORD

COMPANY ATLANTIC RICHFIELD COMPANY

WELL SORGHUM GULCH #11

FIELD SORGHUM GULCH

COUNTY RIO BLANCO STATE COLORADO

SCHL. FR 2815
SCHL. TD 2824
DRLR TD 2826
Elev:
KB -
DF -
GL 6900

Schlumberger

# DUAL LATEROLOG

COUNTY RIO BLANCO
FIELD or LOCATION SORGHUM GULCH
WELL SORGHUM GULCH #11
COMPANY ATLANTIC RICHFIELD

COMPANY ATLANTIC RICHFIELD COMPANY

WELL SORGHUM GULCH #11

FIELD SORGHUM GULCH

COUNTY RIO BLANCO STATE COLORADO

LOCATION: 12' NSL & 160' WEL API Serial No.

Sec. 7 Twp. 3S Rge. 96W

Other Services:
TEMP
BHC-GR
L-9

Permanent Datum: G.L., Elev. 6900
Log Measured From G.L. 0 Ft. Above Perm. Datum
Drilling Measured From G.L.

Elev.: K.B.
D.F.
G.L. 6900

| | | | | |
|---|---|---|---|---|
| Date | 9-3-74 | | | |
| Run No. | ONE | | | |
| Depth—Driller | 2826 | | | |
| Depth—Logger | 2830 | | | |
| Btm. Log Interval | 2818 | | | |
| Top Log Interval | 393 | | | |
| Casing—Driller | 8 5/8@ 62 | @ | @ | @ |
| Casing—Logger | - | | | |
| Bit Size | 6 1/4 TO 12823 | 4 7/8 TO TD | | |
| Type Fluid in Hole | WATER | | | |
| Dens. / Visc. | - / - | | | |
| pH / Fluid Loss | - / - ml | ml | ml | ml |
| Source of Sample | MUDPIT | | | |
| $R_m$ @ Meas. Temp. | 3.52@ 87 °F | @ °F | @ °F | @ °F |
| $R_{mf}$ @ Meas. Temp. | - @ °F | @ °F | @ °F | @ °F |
| $R_{mc}$ @ Meas. Temp. | - @ °F | @ °F | @ °F | @ °F |
| Source: $R_{mf}$ $R_{mc}$ | - - | | | |
| $R_m$ @ BHT | 2.42@ 127°F | @ °F | @ °F | @ °F |
| Time Since Circ. | 2 DAYS | | | |
| Max. Rec. Temp. | 127 °F | °F | °F | °F |
| Equip. / Location | 5639 / VRNL | | | |
| Recorded By | ED MIXA | | | |
| Witnessed By | BERKHEISER | | | |

FOLD HERE

The well name, location and borehole reference data were furnished by the customer.

CHANGES IN MUD TYPE OR ADDITIONAL SAMPLES

| | | | | |
|---|---|---|---|---|
| Date | Sample No. | | | |
| Depth - Driller | | | | |
| Type Fluid in Hole | | | | |
| Dens. / Visc. | | | | |
| ph / Fluid Loss | | ml | ml | ml |
| Source of Sample | | | | |
| $R_m$ @ Meas. Temp. | | @ °F | @ °F | @ °F |
| $R_{mf}$ @ Meas. Temp. | | @ °F | @ °F | @ °F |
| $R_{mc}$ @ Meas. Temp. | | @ °F | @ °F | @ °F |
| Source: $R_{mf}$ / $R_{mc}$ | | | | |
| $R_m$ @ BHT | | @ °F | @ °F | @ °F |
| $R_{mf}$ @ BHT | | @ °F | @ °F | @ °F |
| $R_{mc}$ @ BHT | | @ °F | @ °F | @ °F |

SCALE CHANGES

| Type Log | Depth | Scale Up Hole | Scale Down Hole |
|---|---|---|---|
| | | | |

REMARKS

Service Order No. - 2995

NOTE:
BOTH RESISTIVITY SCALES WERE SHIFTED ONE DECADE TO THE LEFT TO ENABLE CURVE TO STAY ON THE FILM WITHOUT BACK-UP SPOTS. SCALE IS CORRECTLY SHOWN BELOW.

SP TRACED ON LLD FROM NO CURRENT SP LOG W/ LL TOOL

EQUIPMENT DATA

| | | | |
|---|---|---|---|
| Run No. | ONE | | |
| Panel No. | E-742 | C-744 | |
| Cart. No. | A-738 | | |
| Sonde No. | E-748 | | |
| Mem. Panel No. | - | | |
| G.R. Cart. No. | - | | |
| G.R. Panel No. | - | | |
| TTR No. | - | | |
| Speed-F.P.M. | 60 | | |

CALIBRATION DATA

CALIBRATION: BACKGND SOURCE GALV. INCR. SENS. TAB TIME

| CALIBRATION: | BACKGND. | SOURCE | GALV. INCR. | SENS. TAP | SENS. TAP | TIME | | |
|---|---|---|---|---|---|---|---|---|
| | CPS. | CPS. | DIVISION | (FOR CAL.) | (RECORD) | CONST. | | |
| GAMMA RAY: | | | | | | | | |
| | | | | | | | | |

All interpretations are opinions bosed on inferences from electrical or other measurements and we cannot, and do not guarantee the accurocy or correctness of any interpretations, and we shall not, except in the case of gross or willful negligence on our part, be lioble or responsible for ony loss, costs, damoges or expenses incurred or sustained by anyone resulting from any interpretation made by ony of our officers, agents or employees. These interpretations are also subject to Clouse 7 of our General Terms and Conditions as set out in our current Price Schedule.

## SPONTANEOUS-POTENTIAL
MILLIVOLTS

— 20 MV +

DEPTHS

## RESISTIVITY
OHMS. $M^2$ M

**DEEP LATEROLOG**

2.0 10 100 1000 10000 20000

**SHALLOW LATEROLOG**

2.0 10 100 1000 10000 20000

FLUID LEVEL

0400

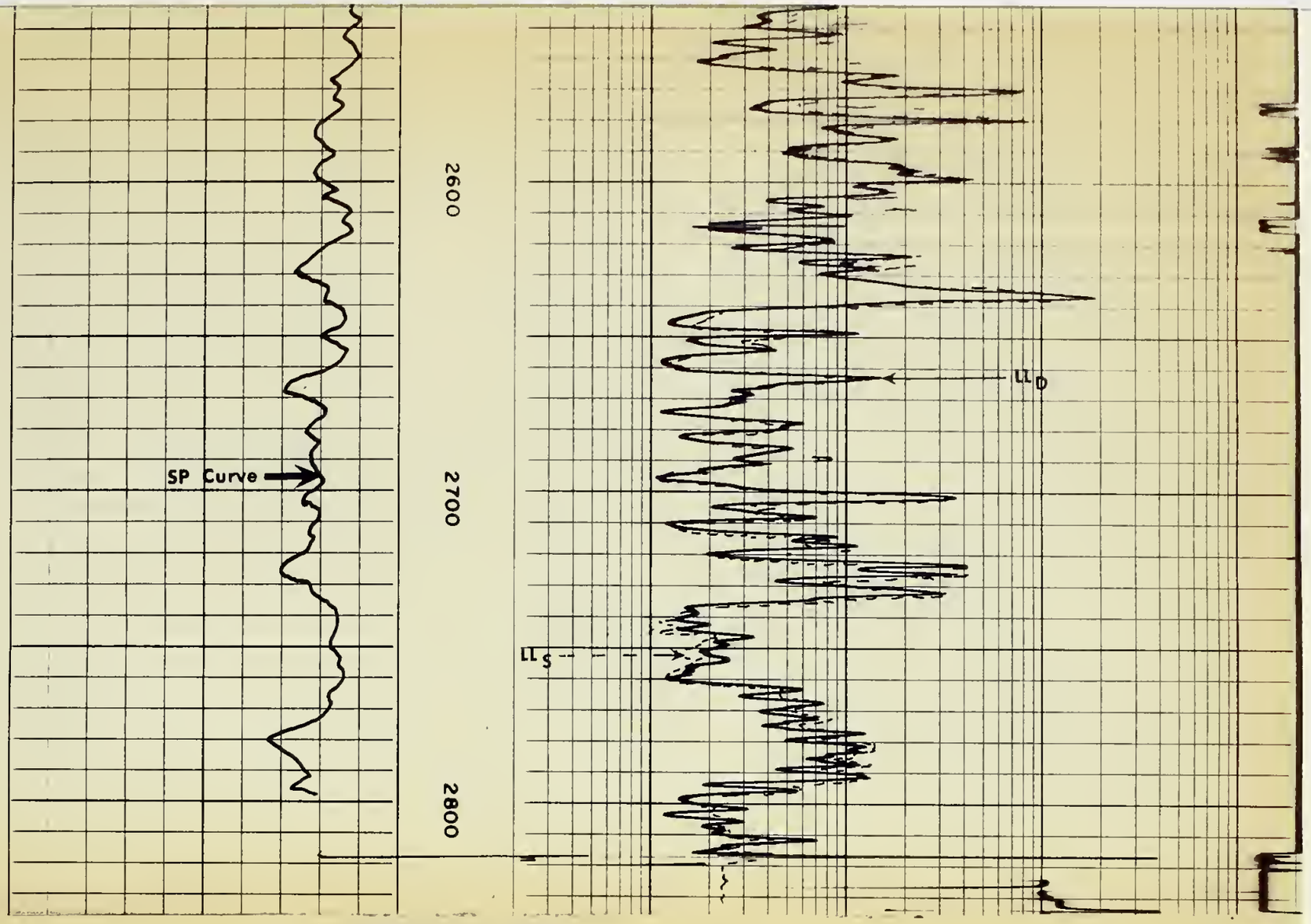
0500

0600

0700 0800 0900 1000 1100 1200

00 1400 1500 1600 1700 1800 1900

2000 2100 2200 2300 2400 2500




DETAIL LOG
5" = 100'

| SPONTANEOUS-POTENTIAL<br>MILLIVOLTS | DEPTHS | RESISTIVITY<br>OHMS. $M^2$ M |
|---|---|---|
| $-\left\|\frac{20}{MV}\right\|+$ | | DEEP LATEROLOG<br>2.0 10 100 1000 10000 2000<br>SHALLOW LATEROLOG<br>2.0 10 100 1000 10000 2000 |

FLUID LEVEL

0400

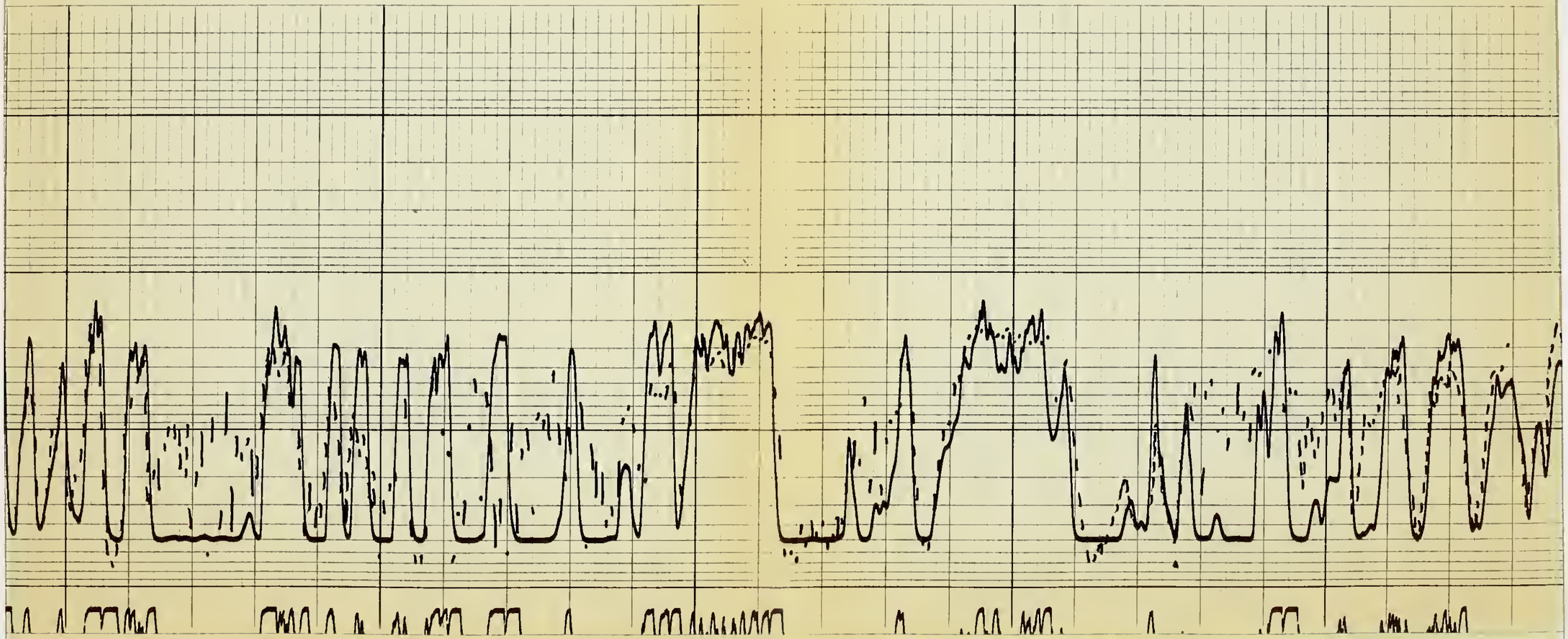
0500

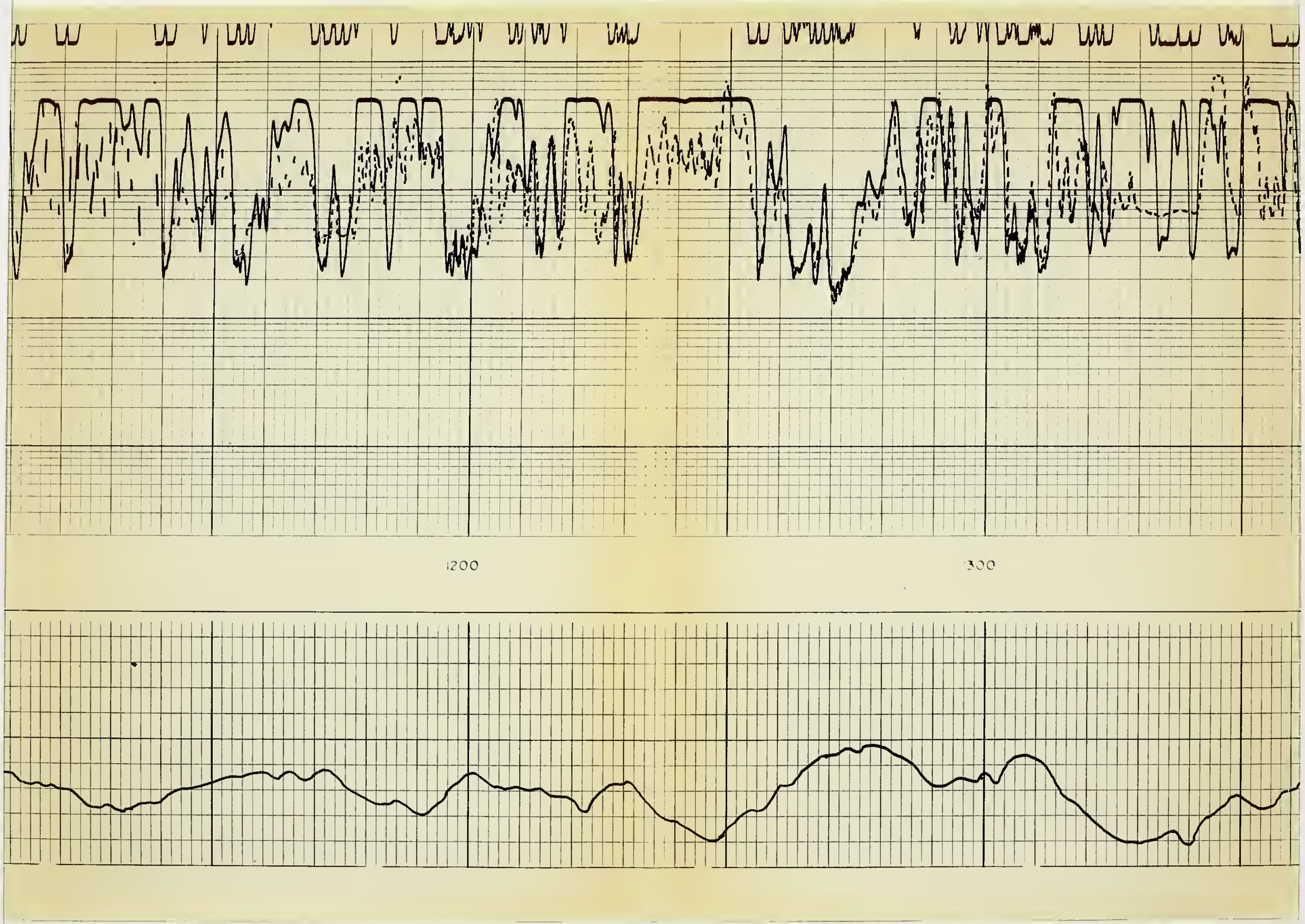
0600

0700

0800

0011 0001 0062



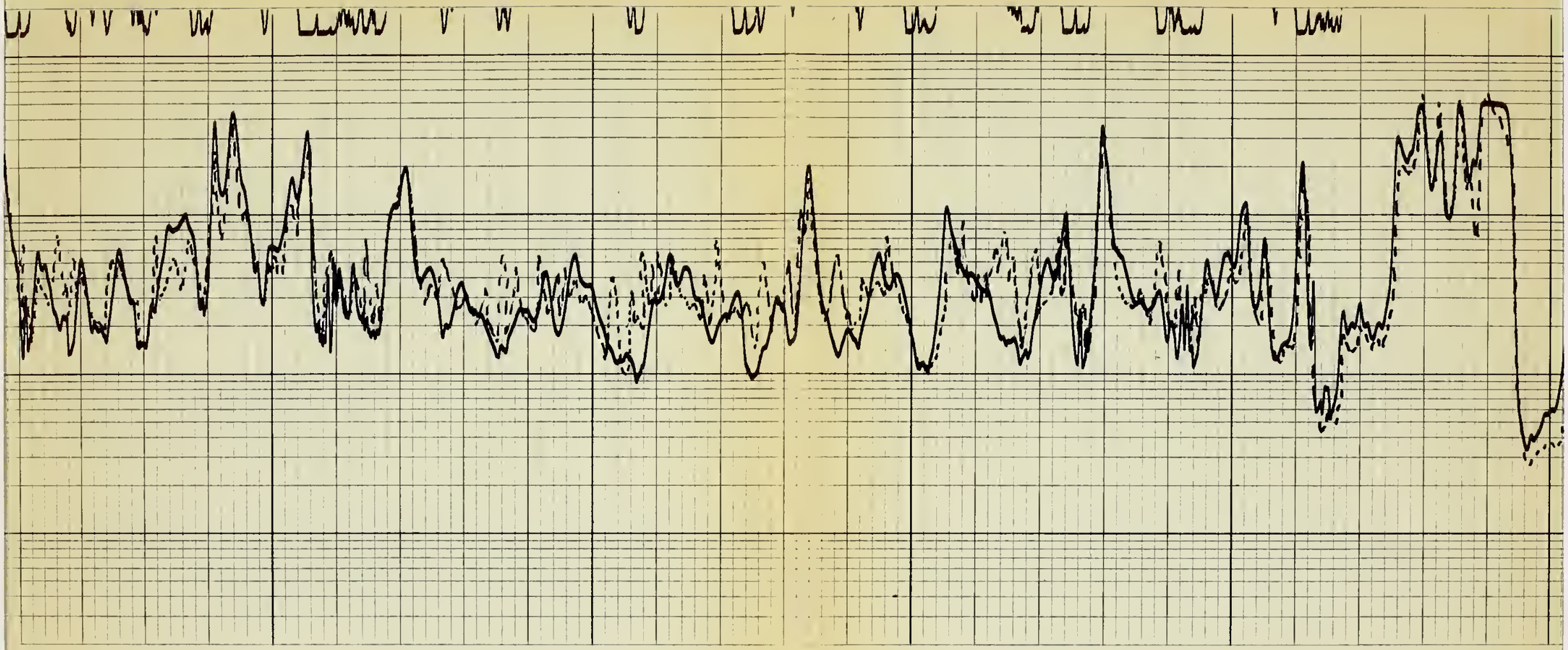

1200
1300

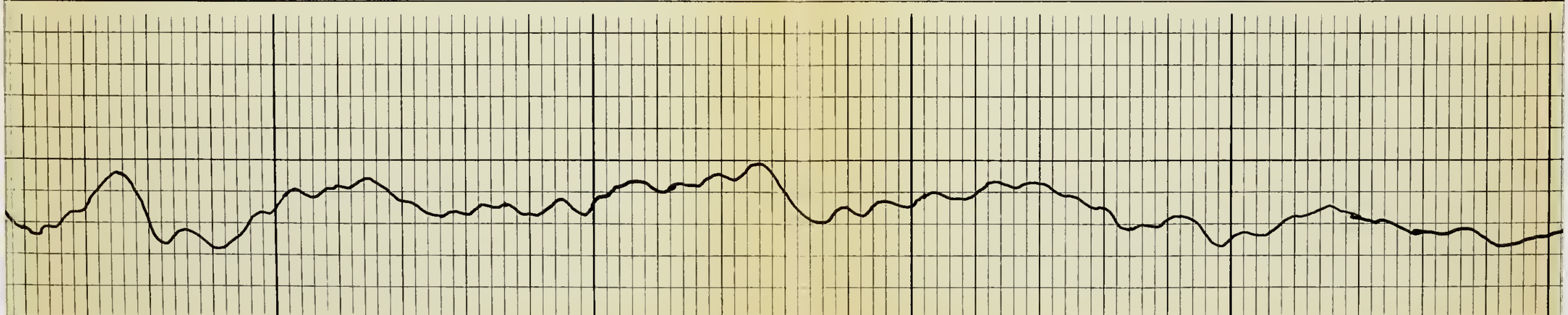
1400

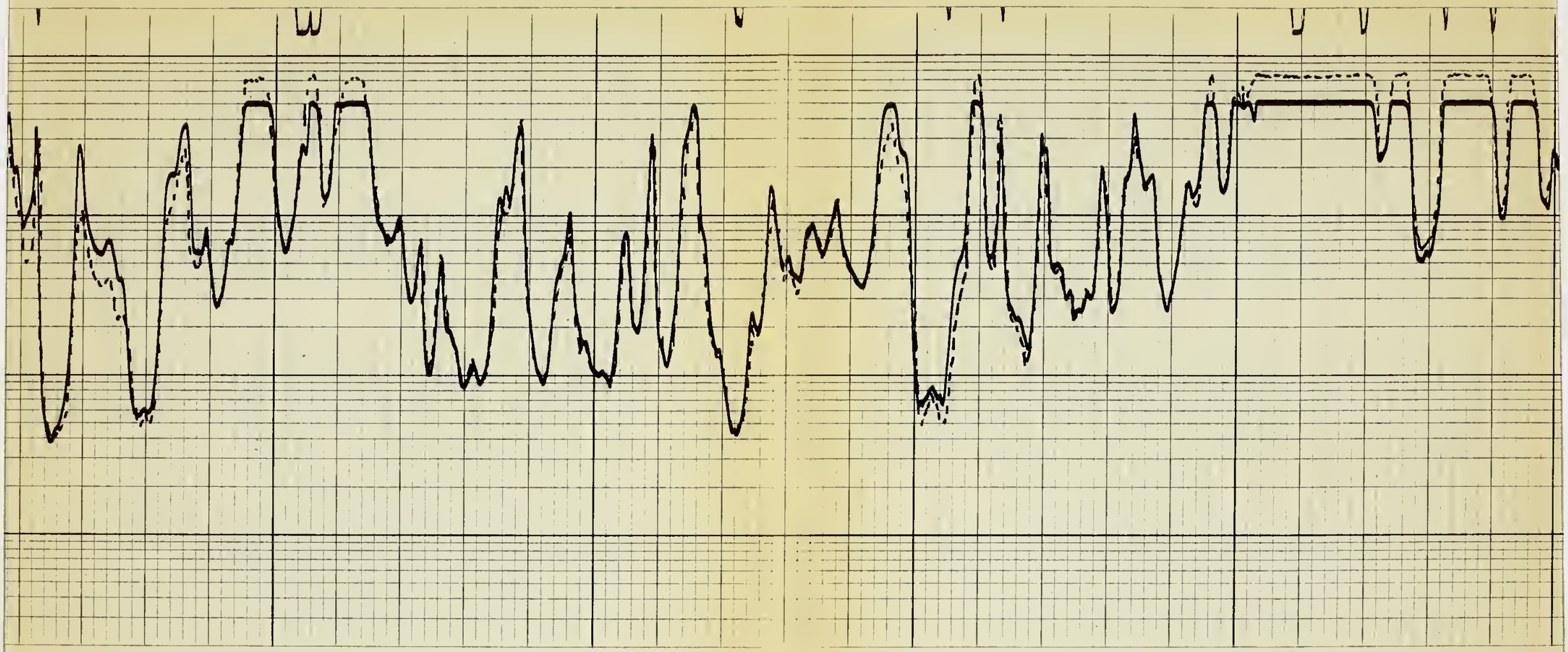
1500

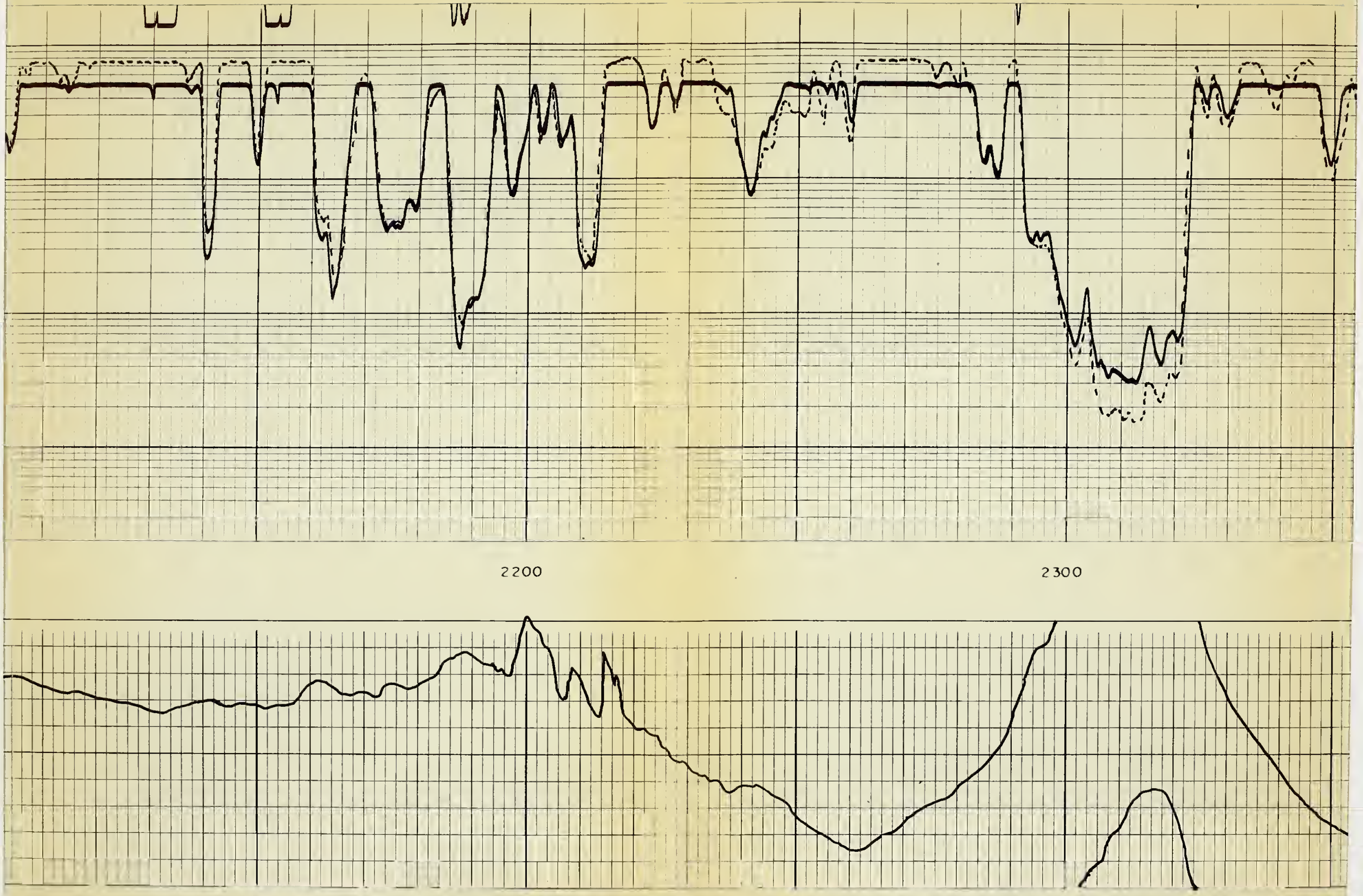
1600

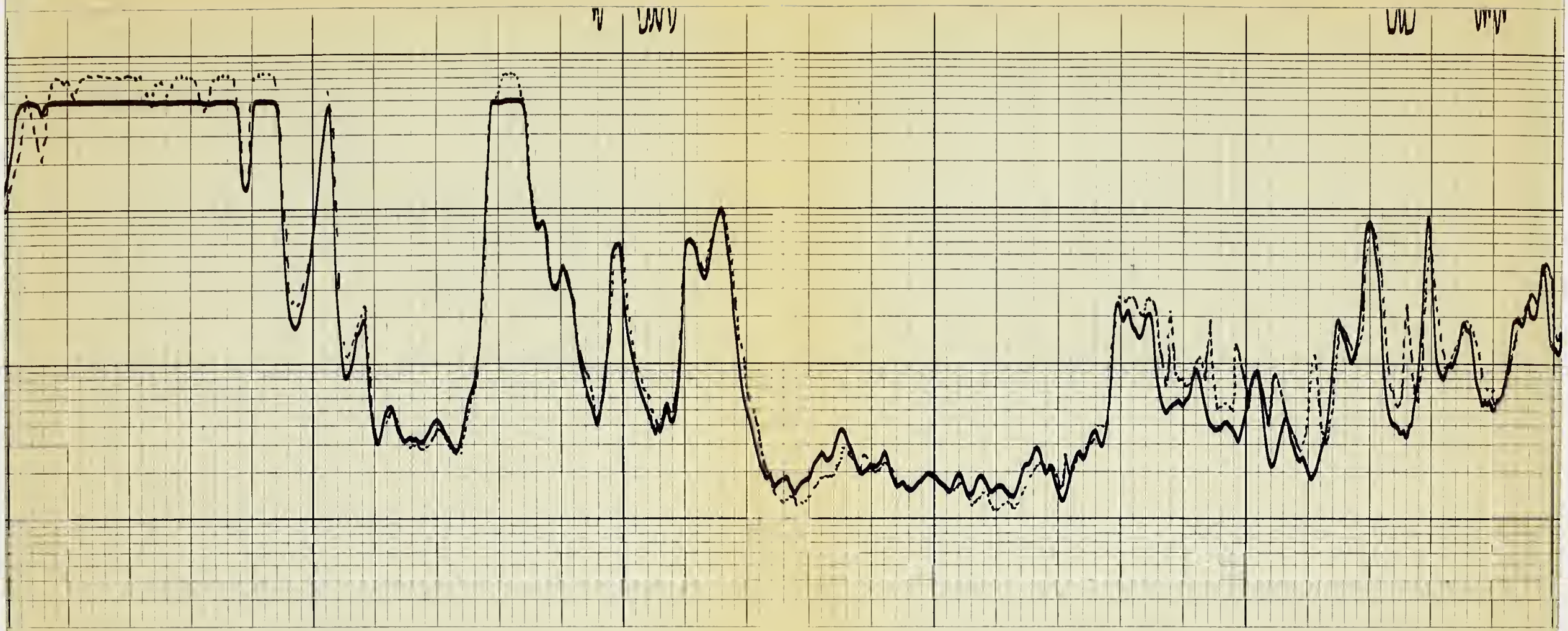
S.P. SHIFT

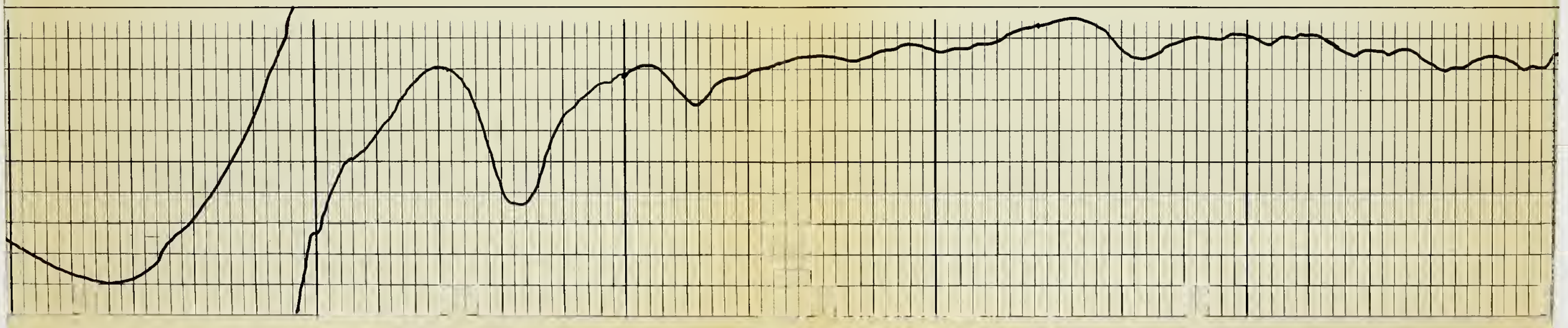

1700
1800

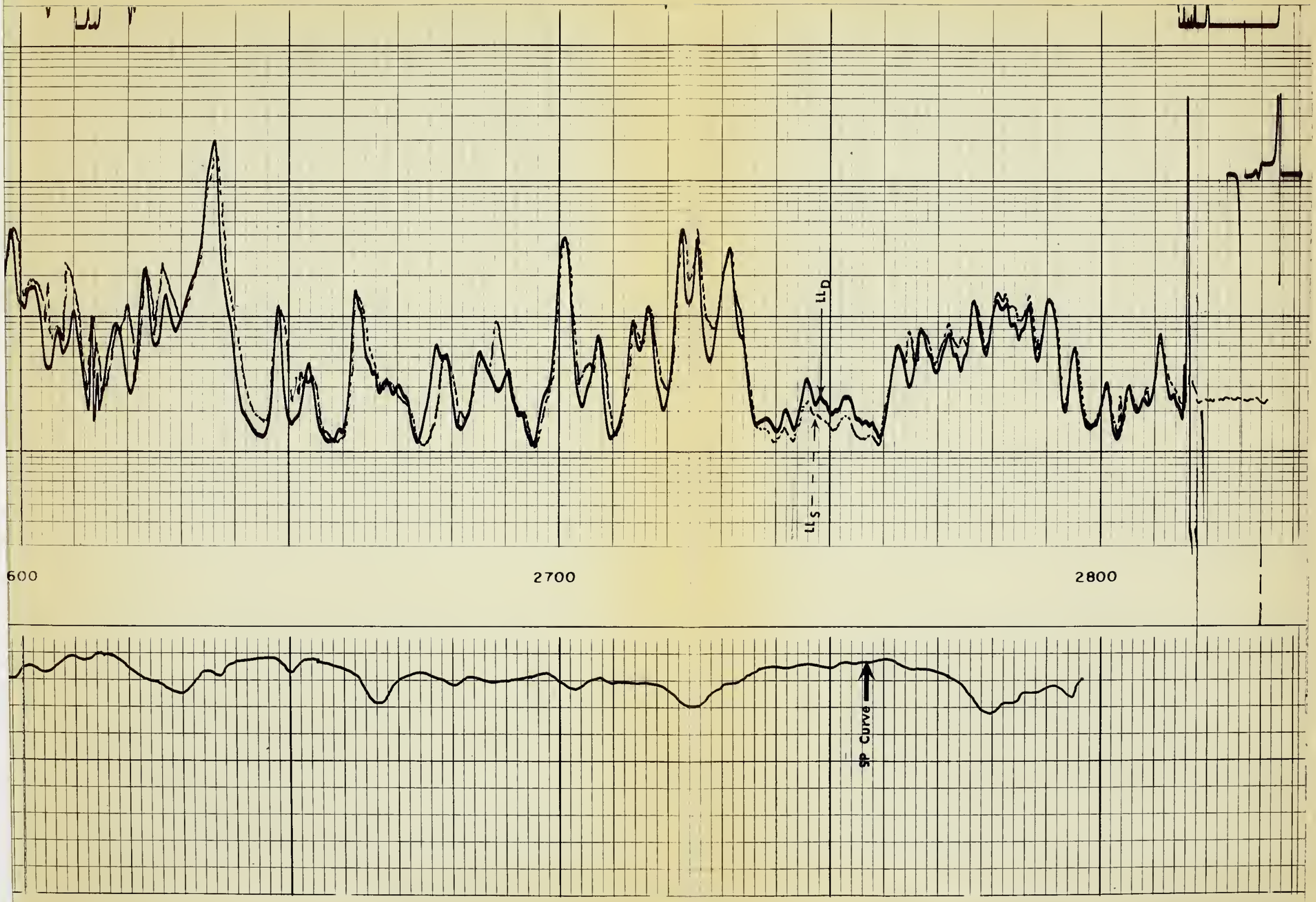


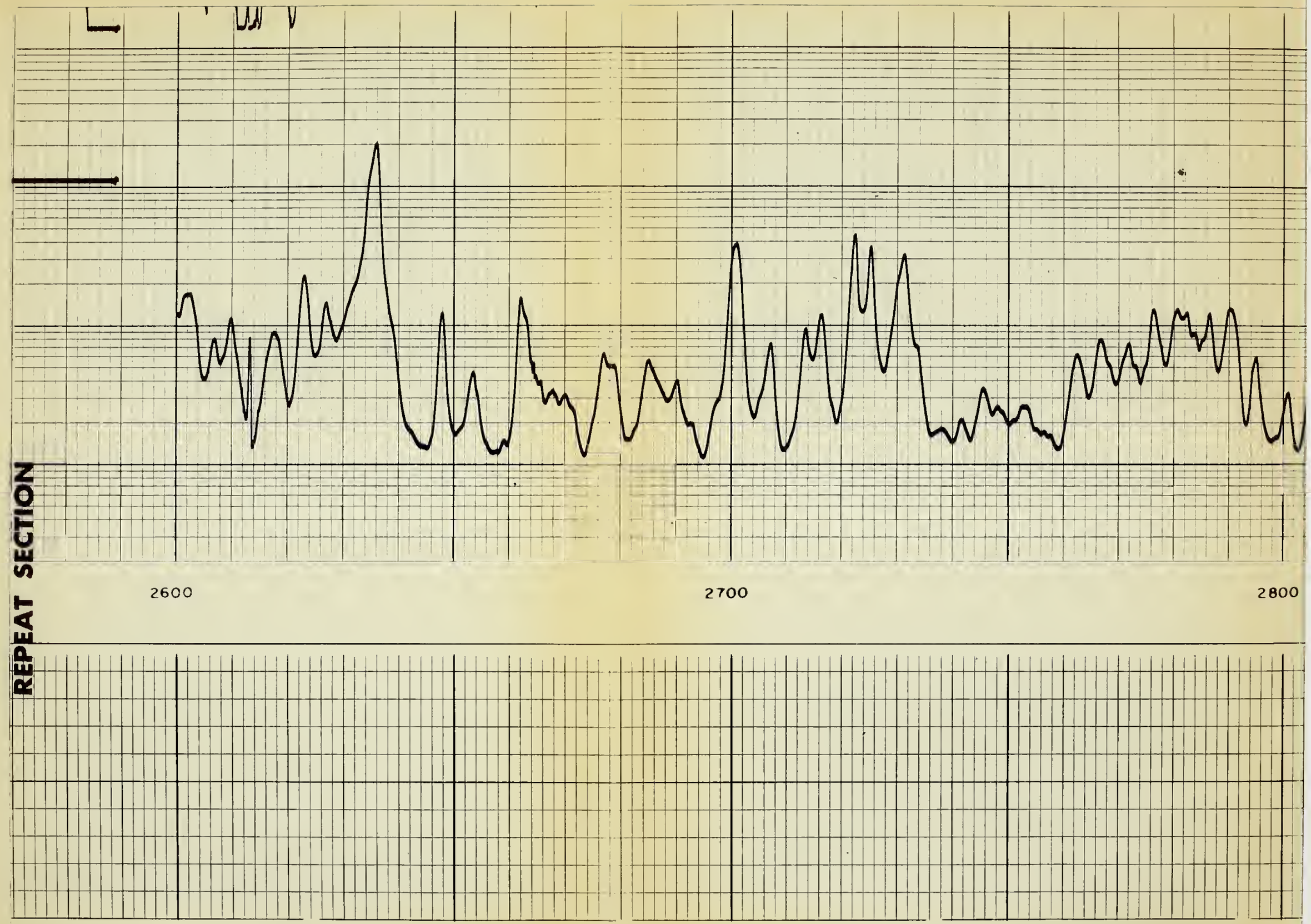

1900
2000
2100

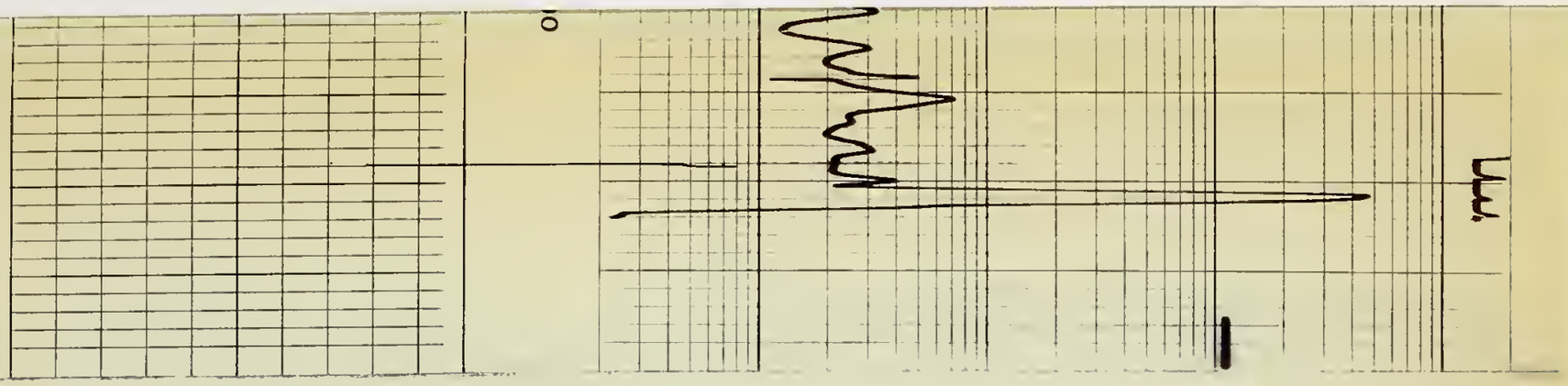

2200
2300

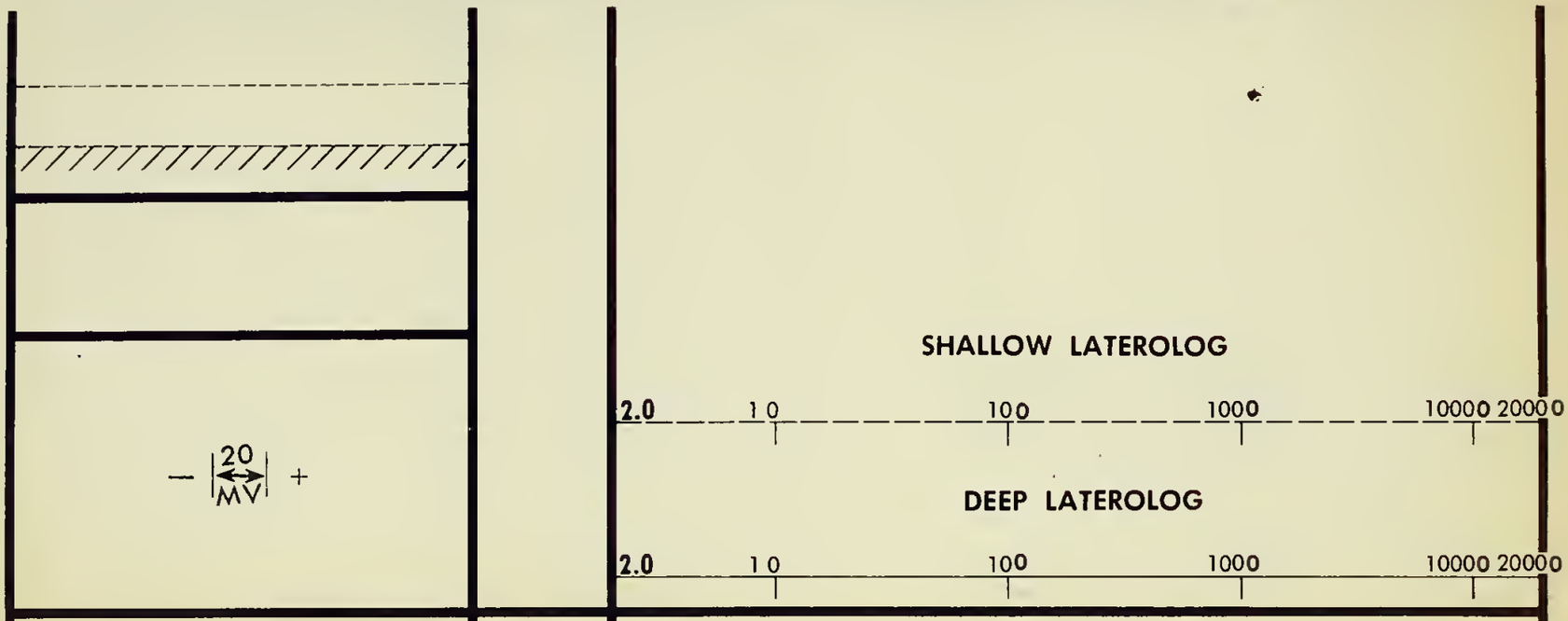

2400
2500
260




LL D
LL S
SP Curve
2700
2800


REPEAT SECTION
2600
2700
2800






SPONTANEOUS-POTENTIAL
MILLIVOLTS

DEPTHS

RESISTIVITY
OHMS. $M^2$ M

COMPANY ATLANTIC RICHFIELD COMPANY

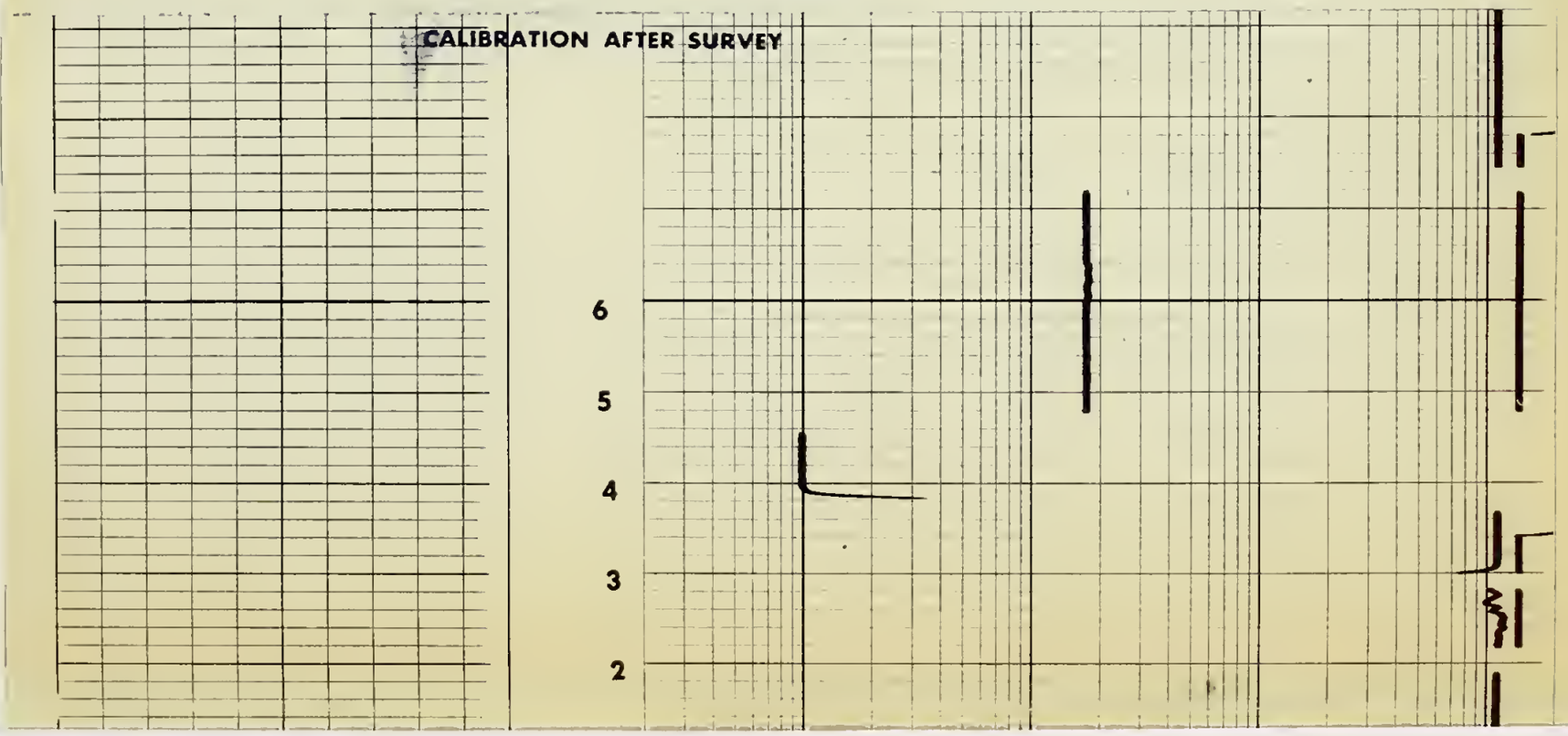
WELL SORGHUM GULCH #11

FIELD SORGHUM GULCH

COUNTY RIO BLANCO STATE COLORADO

SCHL. FR 2818
SCHL. TD 2830
DRLR TD 2826
Elev:
KB
DF
GL 6900

## CALIBRATION RECORD



1
1
6
4
3
2
1
CALIBRATION BEFORE SURVEY
6
4
3
2
1
6
4
3
2

## SIMULTANEOUS DUAL LATEROLOG CALIBRATION CODING

1. MECHANICAL ZERO
2. RECORD SET (SP CALIBRATE)
3. TEST - 1 (1 ohm-m)
4. TEST - 2 (1000 ohm-m)
5. TOOL CAL (31.6 ohm-m)

## GAMMA RAY CALIBRATION CODING

1. MECHANICAL ZERO
2. TEST - 1 - ELECTRICAL ZERO
3. TOOL CAL - BACKGROUND
4. TOOL CAL- TEST JIG ON
5. CAL CHECK f = _____

## SEQUENTIAL DUAL LATEROLOG CALIBRATION CODING

1. MECHANICAL ZERO
2. CABLE BALANCE ADJUST - LLd ONLY
3. FUNCTION FORMER 1000 ohm-m
4. FUNCTION FORMER 1 ohm-m
5. MEMORIZER ADJUST - LLd ONLY (DOES NOT APPLY IF GR IS NOT RUN)
6. CALIBRATE LLd - 17 ohm-m
   LLd - 29 ohm-m

# CALIBRATION RECORD

COMPANY ATLANTIC RICHFIELD COMPANY

WELL SORGHUM GULCH #11

FIELD SORGHUM GULCH

COUNTY RIO BLANCO STATE COLORADO

SCHL. FR 2818
SCHL. TD 2830
DRLR TD 2826
Elev:
KB _____
DF _____
GL 6900

SWS-1975-A

Schlumberger

# TEMPERATURE LOG

COUNTY RIO BLANCO
FIELD or LOCATION SORGHUM GULCH
WELL SORGHUM GULCH #11
COMPANY ATLANTIC RICHFIELD

COMPANY ATLANTIC RICHFIELD COMPANY

WELL SORGHUM GULCH #11

FIELD SORGHUM GULCH

COUNTY RIO BLANCO STATE COLORADO

LOCATION
12' NSL & 160' WEL
Sec. 7 Twp. 3S Rge. 96W

Other Services:
L-9
BHC

Permanent Datum: ; Elev.:
Log Measured From , Ft. Above Perm. Datum
Drilling Measured From

Elev.: K.B.
D.F.
G.L.

| | | | |
|---|---|---|---|
| Date | 9-3-74 | | |
| Run No. | ONE | | |
| Depth—Driller | 2826 | | |
| Depth—Logger | 2823 | | |
| Btm. Log Interval | 2822 | | |
| Top Log Interval | 393 | | |
| Casing—Driller | 8 5/8 @62 | @ | @ |
| Casing—Logger | - | | |
| Casing Size 1 | To | To | To |
| 2 | To | To | To |
| Casing Weight 1 | | | |
| 2 | | | |
| Casing Thickness 1 | | | |
| 2 | | | |
| Bit Size 1 | 6 1/4 To 1282 | To | To |
| 2 | 4 7/8 To 2826 | To | To |
| Type Fluid in Hole | WATER @ 393 | | |
| Dens. / Visc. | - / - | | |
| Time Since Circ. | 2 DAYS | | |
| BHT | 127 | | |
| Equip. / Location | 5639 / VERNAL | | |
| Recorded By | ED MIXA | | |
| Witnessed By | SAM BERKHEISER | | |

The well name, location and borehole reference data were furnished by the customer.

FOLD HERE

REMARKS:

CEMENTATION DATA

| Date | Depth | Type of Cement | No. of Sacks | Additives | Calculated Top |
|---|---|---|---|---|---|
| | | | | | |

TEMPERATURE °F.

REDUCED SENSITIVITY TEMPERATURE

SWS-368-C

REDUCED TEMPERATURE

TEMPERATURE

500

600

700
800
900

0011

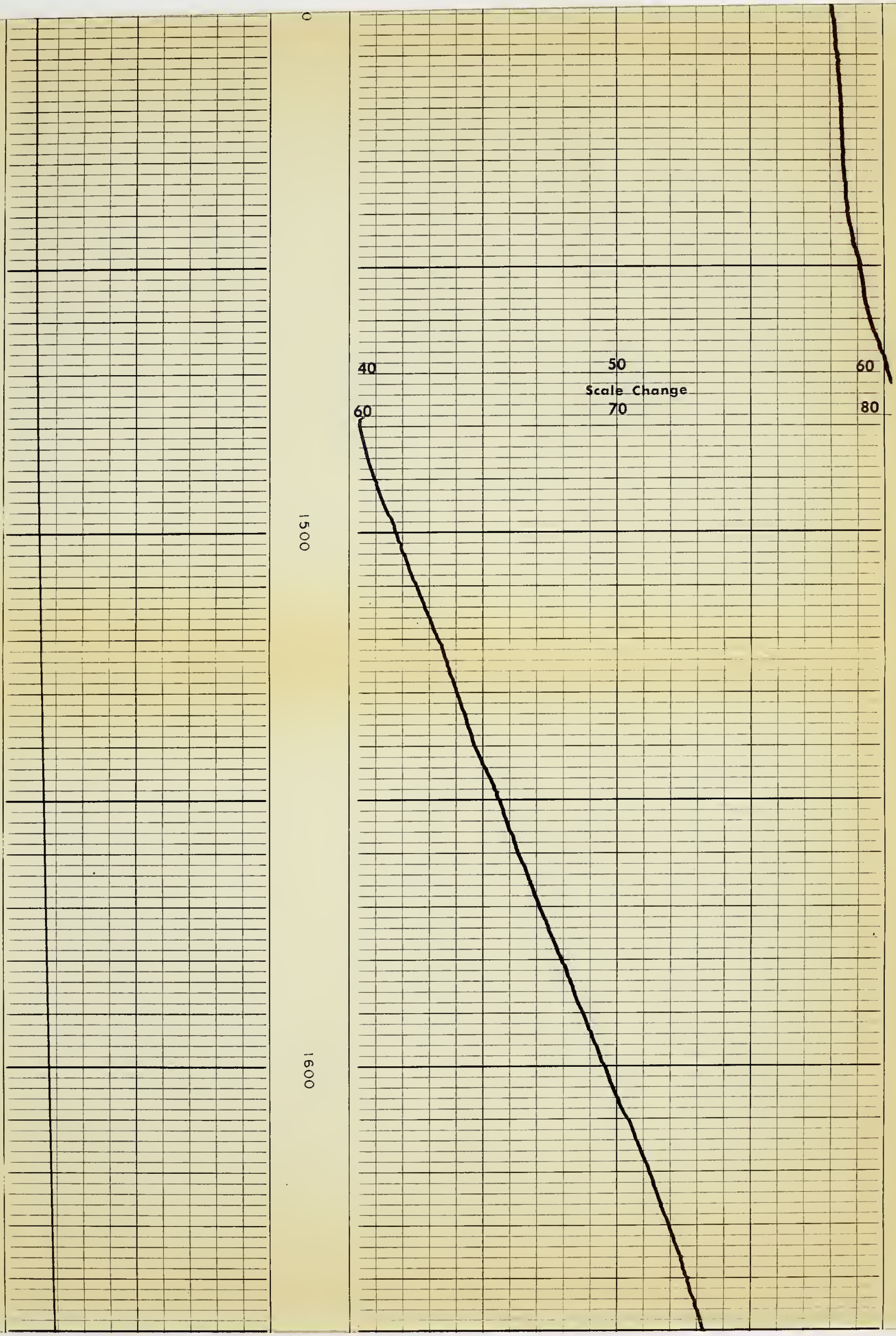
0001

006

1200

1300

14


0
1500
1600
40
50
60
Scale Change
60
70
80

1700

1800

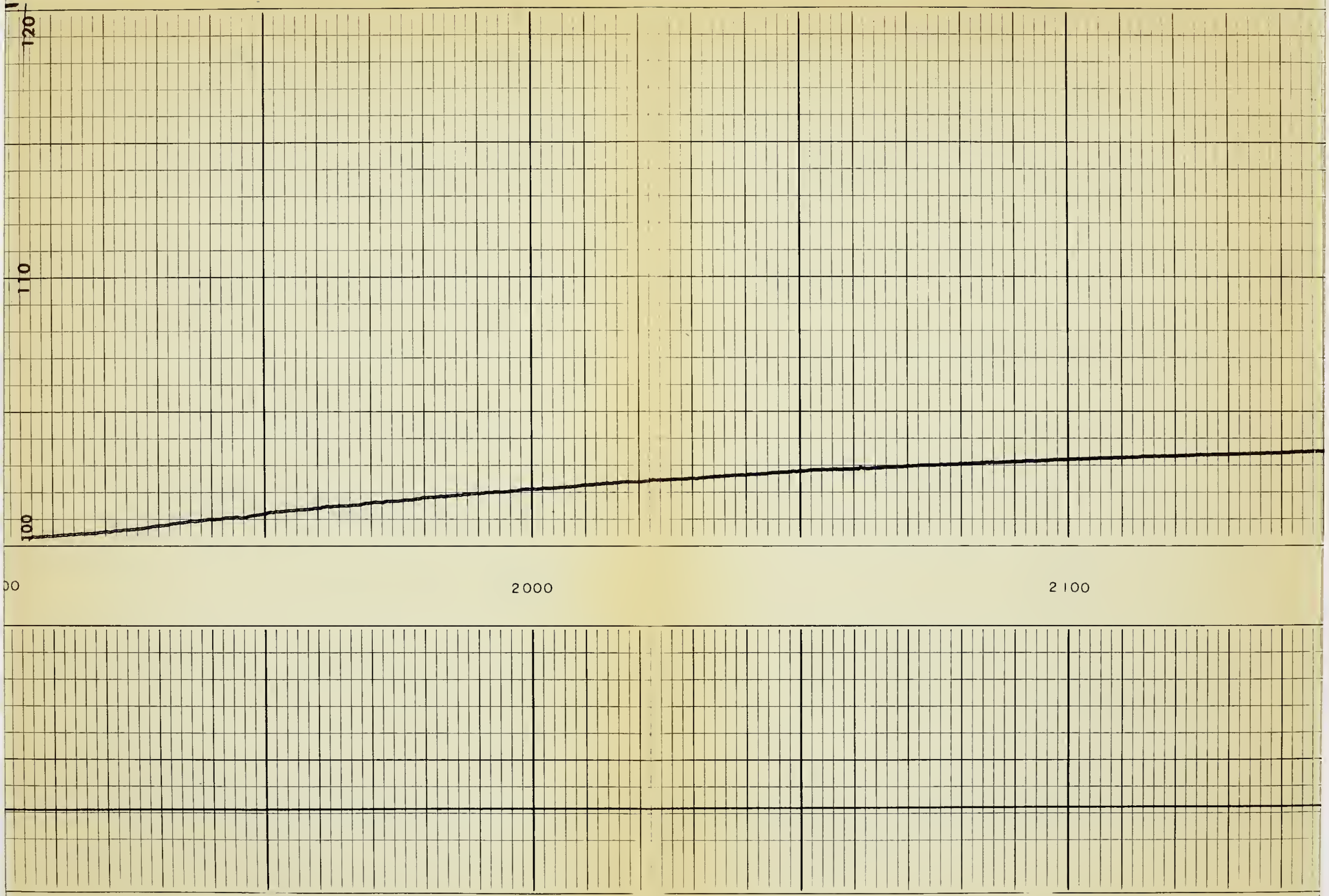
60 70 80

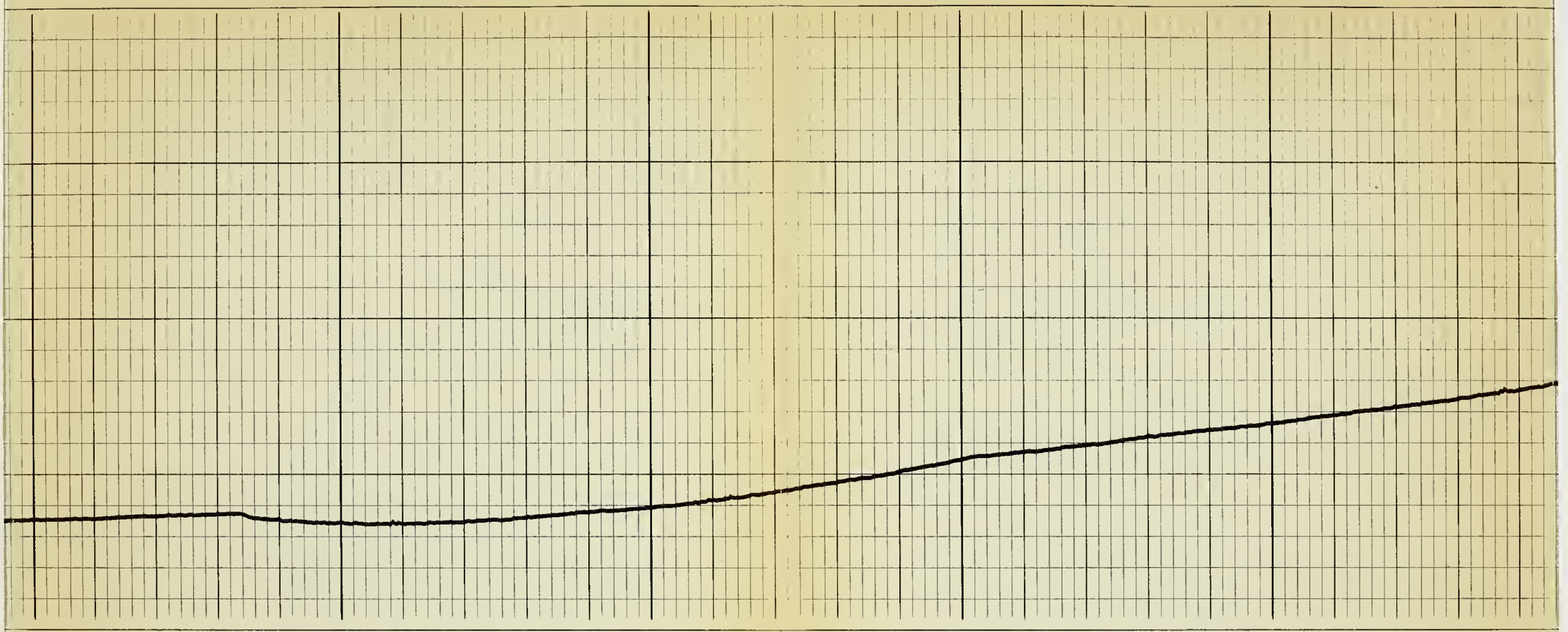
Scale Change

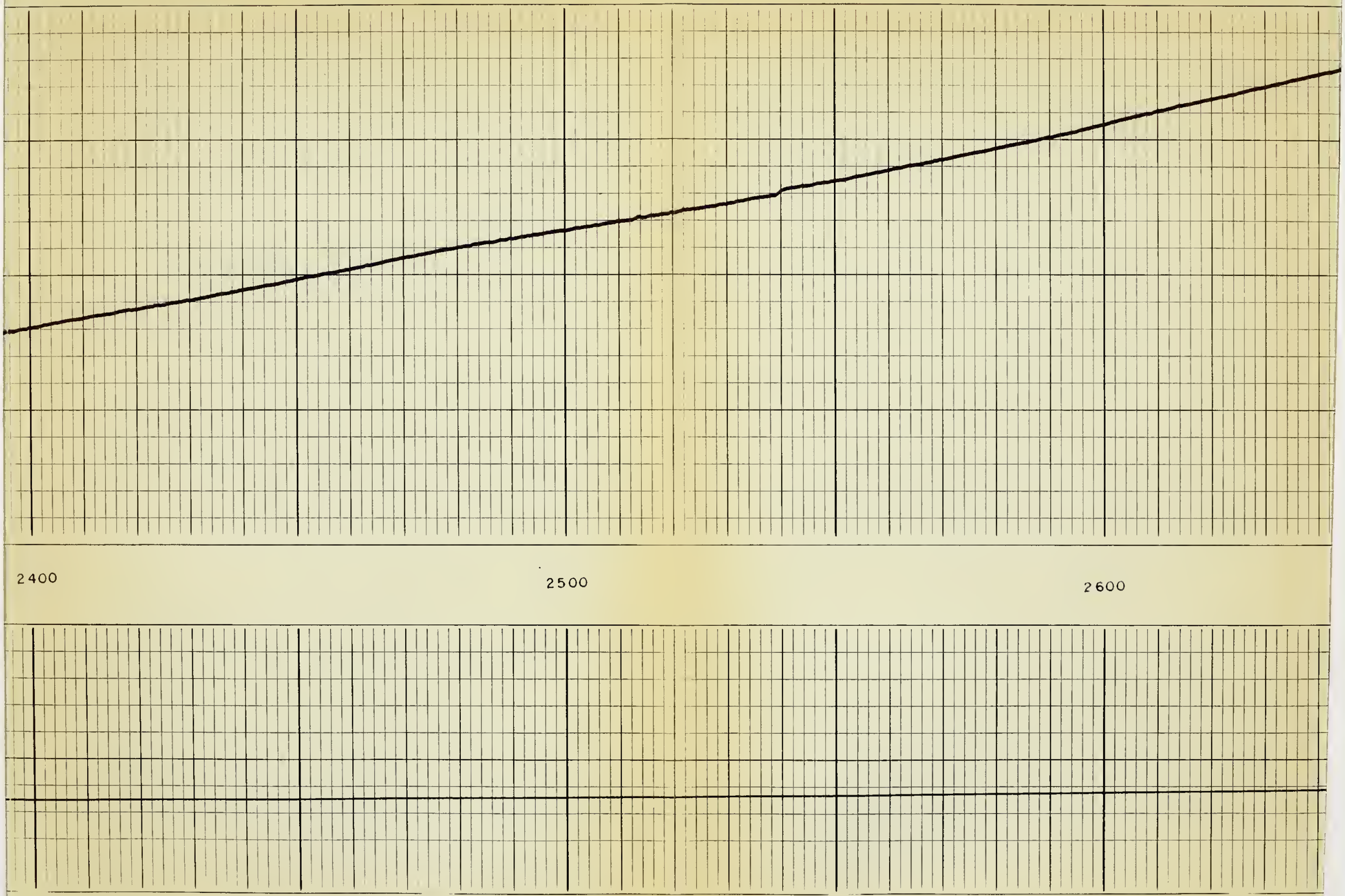
80 90 100

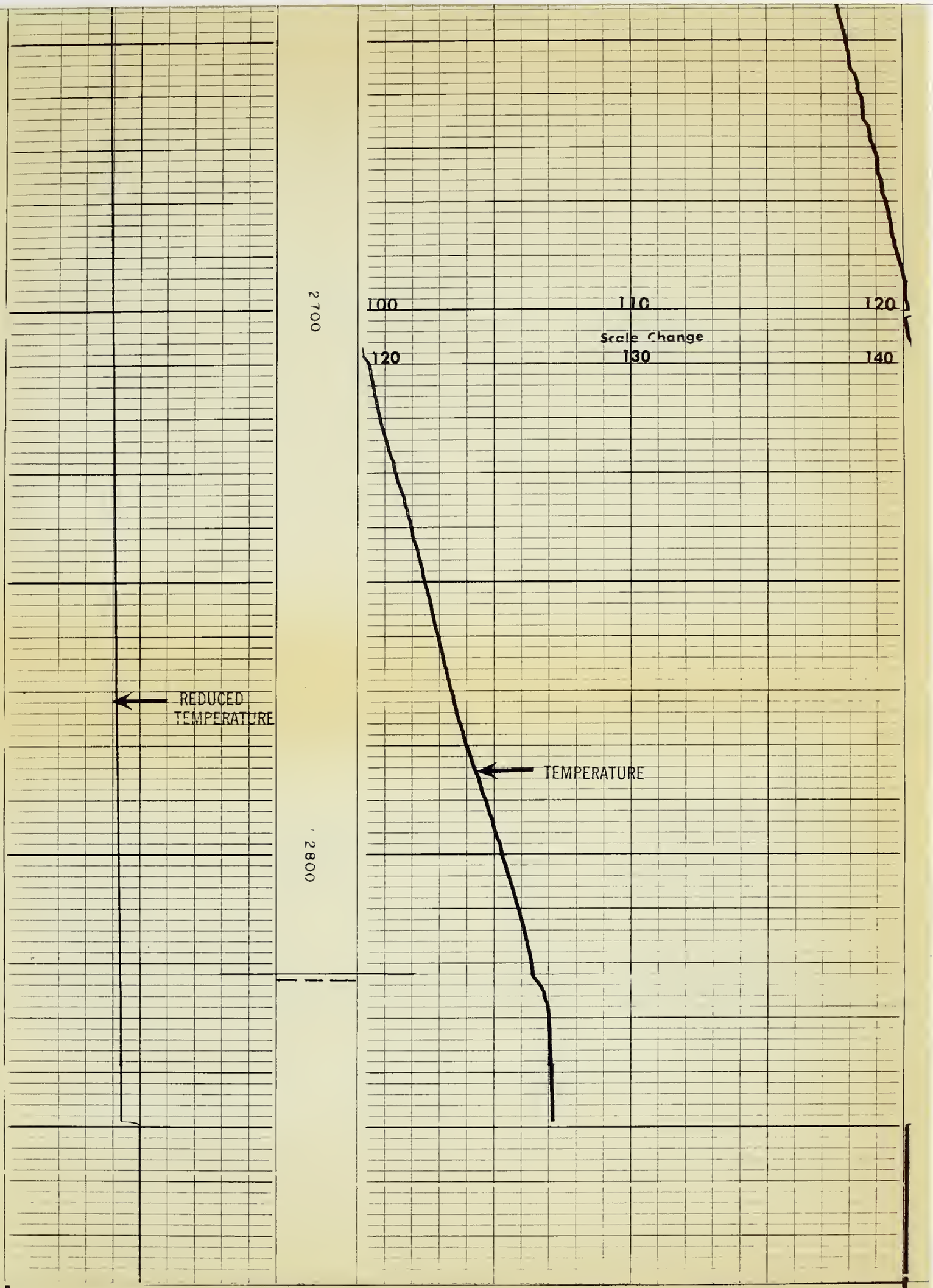
80 90 100

Scale Change


120
110
100
00
2000
2100


2200
2300


2400
2500
2600




TEMPERATURE °F.

COMPANY ATLANTIC RICHFIELD COMPANY

WELL SORGHUM GULCH #11

FIELD SORGHUM GULCH

COUNTY RIO BLANCO STATE COLORADO

SCHL. F. R. 2822
SCHL. T. D. 2823
DRLR. T. D. 2826

COREHOLE SG-18

THIS ENVELOPE CONTAINS THE FOLLOWING GEOPHYSICAL LOGS:

Schlumberger: Borehole Compensated Sonic
Laterolog
Formation Density
Temperature

II B-368

Schlumberger

# BOREHOLE COMPENSATED SONIC LOG

COUNTY RIO BLANCO
FIELD or LOCATION SORGHUM GULCH
WELL SORGHUM GULCH #18
COMPANY ATLANTIC RICHFIELD

COMPANY ATLANTIC RICHFIELD COMPANY

WELL SORGHUM GULCH #18

FIELD SORGHUM GULCH

COUNTY RIO BLANCO STATE COLORADO

LOCATION: API Seriol No.
1240' FSL & 3661' FEL
Sec. 25 Twp. 3S Rge. 97W

Other Services:
TEMP
LL-7
FDC-GR

Permonent Datum: GL ; Elev.: 7383
Log Meosured From GL , 0 Ft. Above Perm. Datum
Drilling Meosured From GL

Elev.: K.B. ---
D.F. ----
G.L. 7383

| | | | | |
|---|---|---|---|---|
| Date | 10-4-74 | | | |
| Run No. | ONE | | | |
| Depth—Driller | 1430 | | | |
| Depth—Logger | 1425 | | | |
| Btm. Log Interval | 1422 | | | |
| Top Log Interval | 530 | | | |
| Casing—Driller | 7 @ 60 | @ | @ | @ |
| Casing—Logger | - | | | |
| Bit Size | 6 1/4 | | | |
| Type Fluid in Hole | WATER | | | |
| Dens. / Visc. | - / - | | | |
| pH / Fluid Loss | - / - ml | ml | ml | ml |
| Source of Sample | - | | | |
| $R_m$ @ Meas. Temp. | - @ - °F | @ °F | @ °F | @ °F |
| $R_{mf}$ @ Meos. Temp. | - @ - °F | @ °F | @ °F | @ °F |
| $R_{mc}$ @ Meos. Temp. | - @ - °F | @ °F | @ °F | @ °F |
| Source: $R_{mf}$ / $R_{mc}$ | - / - | | | |
| $R_m$ @ BHT | - @ - °F | @ °F | @ °F | @ |
| TIME Circulation Stopped | - | | | |
| | - | | | |
| Max. Rec. Temp. | 82 °F | °F | °F | °F |
| Equip. / Location | 7674 / VRNL | | | |
| Recorded By | HAUGAARD | | | |
| Witnessed By | TAIT | | | |

FOLD HERE

The well name, location and borehole reference data were furnished by the customer.

SCALE CHANGES

| Type Log | Depth | Scale Up Hole | Scale Down Hole |
|---|---|---|---|
| | | | |

LOGGING DATA

| Porosity Selectors | | | | Depth | |
|---|---|---|---|---|---|
| $\Delta t_m$ | $\Delta t_f$ | Cp | ϕ Scale | From | To |
| | | | | | |

REMARKS
LOGGING SPEED - 3600 FPH

Velocity (ft/sec) = 1,000,000 / Interval Transit Time (microseconds per foot)

| | |
|---|---|
| Run No. | ONE |
| Service Order No. | 21443 |
| Fluid Level | 529 |

EQUIPMENT DATA

| | |
|---|---|
| Sonic Panel No. | JG 130 |
| Sonic Cart No. | EA 141 |
| Sonic Sonde No. | KB 161 |
| Mem. Panel No. | AD 173 |
| G.R. Cart. No. | E 98 |
| G.R. Panel No. | EA 355 |
| Caliper No. | D 62 |
| TTR No. | - |
| Centralizers: No. | 2 |
| Type | 1 1/2 |
| Standoffs: No. | - |
| Type | - |
| Time Const.-Sec. | 1 |
| Speed - F.P.M. | 60 |

CALIBRATION DATA

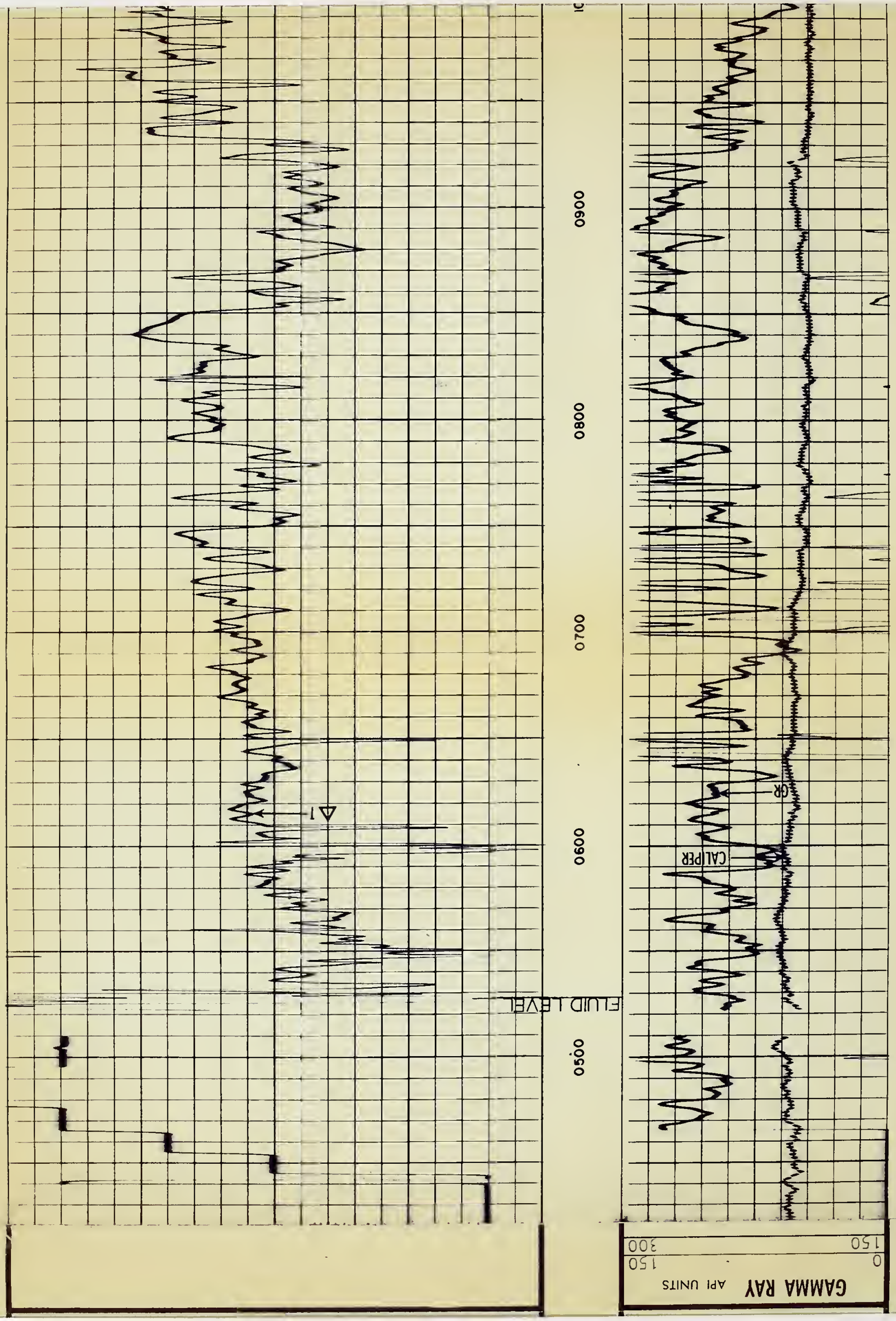
| | | |
|---|---|---|
| GR | BKG. CPS | 30 |
| | Source CPS | 340 |
| | Tc Sec | 1 |

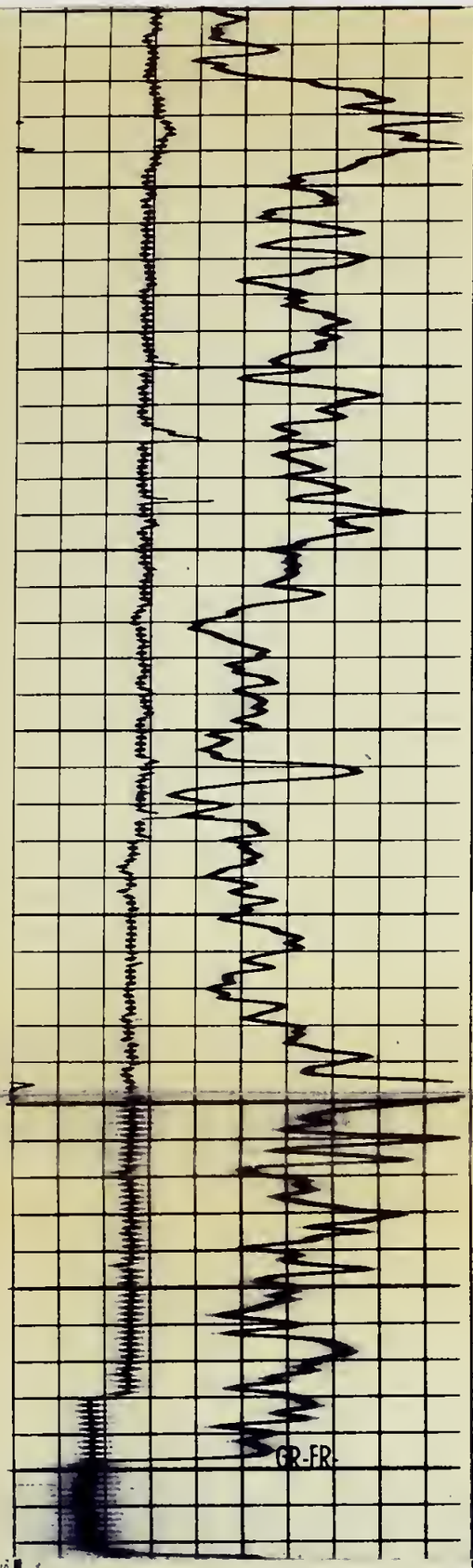
* All interpretations are opinions based on inferences from electrical or other measurements and we cannot, and do not guarantee the accuracy or correctness of any interpretations, and we shall not, except in the case of gross or willful negligence on our part, be liable or responsible for any loss, costs, damages or expenses incurred or sustained by anyone resulting from any interpretation made by any of our officers, agents or employees. These interpretations are also subject to Clause 7 of our General Terms and Conditions as set out in our current Price Schedule.

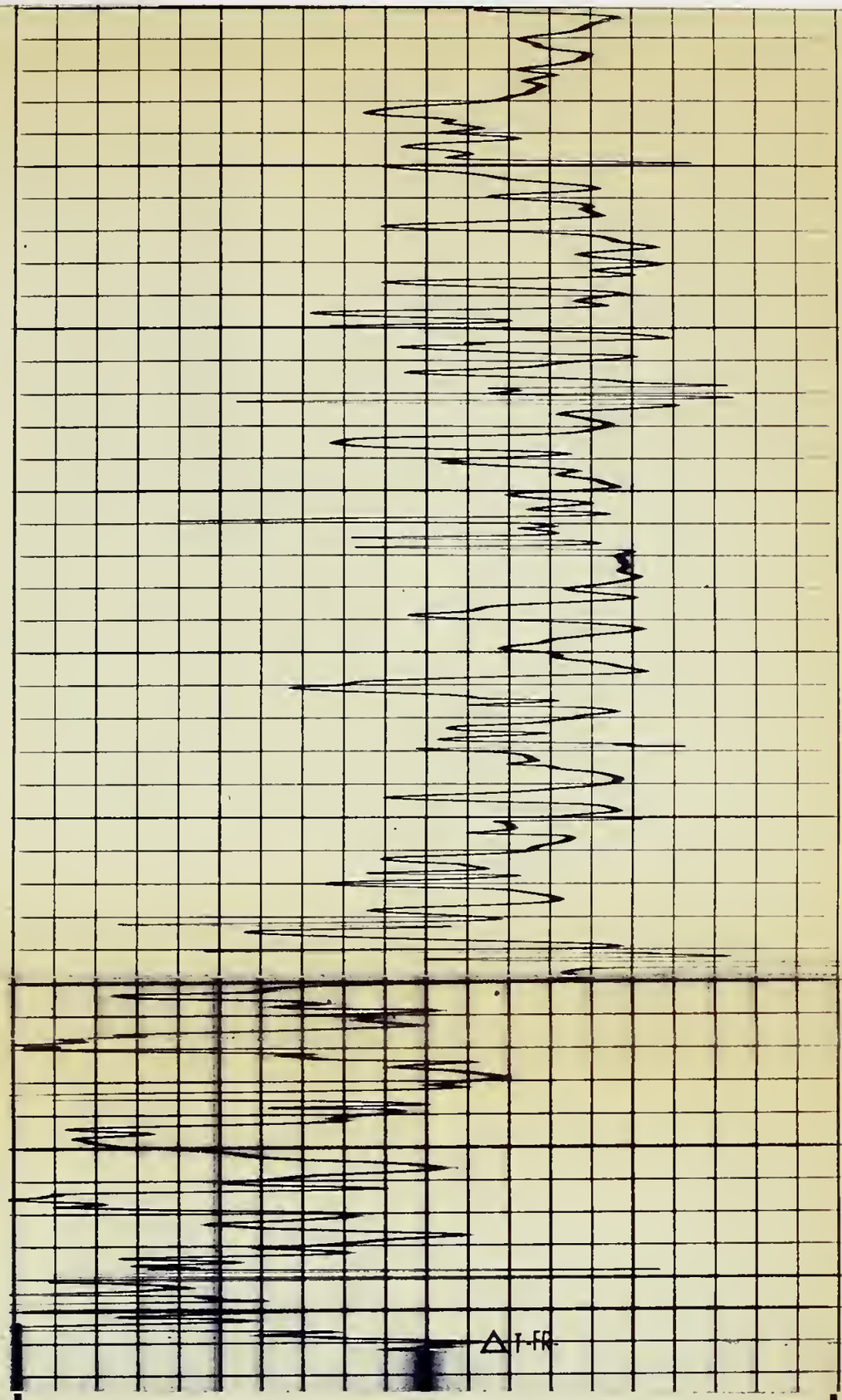
INTERVAL TRANSIT TIME MICROSECONDS PER FOOT T R1 R2
100 50
200 150

DEPTH

CALIPER DIAM. IN INCHES
4 14


GAMMA RAY
API UNITS
0
150
150
300
CALIPER
GR
ΔT
FLUID LEVEL
0500
0600
0700
0800
0900




1100

1200

1300

1400

S-1048-C

**CALIPER**
HOLE DIAM. IN INCHES

0 — 150
150 — 300

**GAMMA RAY**
API UNITS

DEPTHS

T___R1___R2
150 — 100 — 50
250 — 200 — 150

**INTERVAL TRANSIT TIME**
MICROSECONDS PER FOOT

# DETAIL LOG

5″=100′

GAMMA RAY

DE

## GAMMA RAY

API UNITS

0 — 150

150 — 300

## CALIPER

HOLE DIAM. IN INCHES

6 — 14

DEPTHS

## INTERVAL TRANSIT TIME

MICROSECONDS PER FOOT

T___ $R_1$___ $R_2$

150 — 100 — 50

250 — 200 — 150

FLUID LEVEL

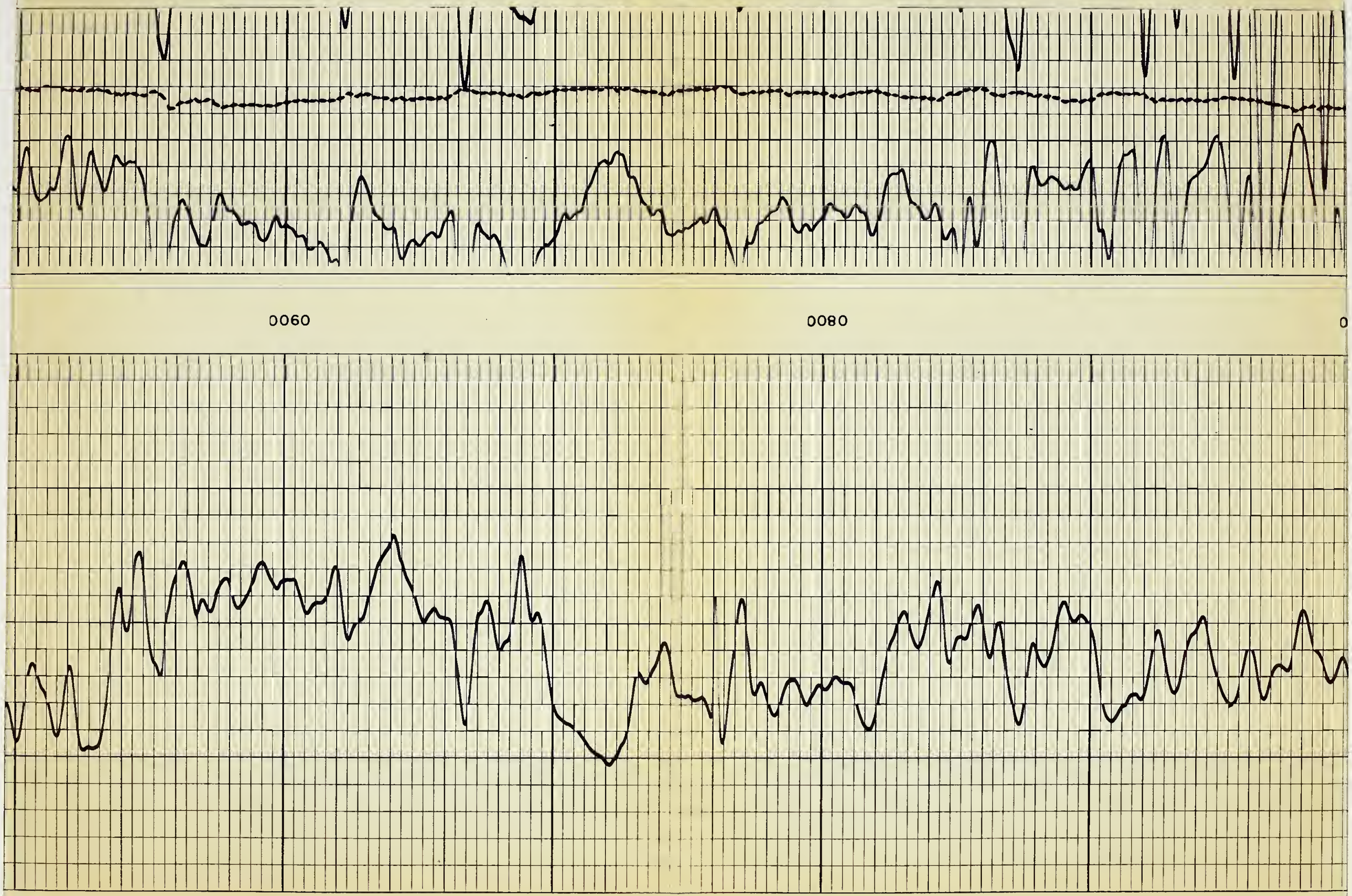
CALIPER

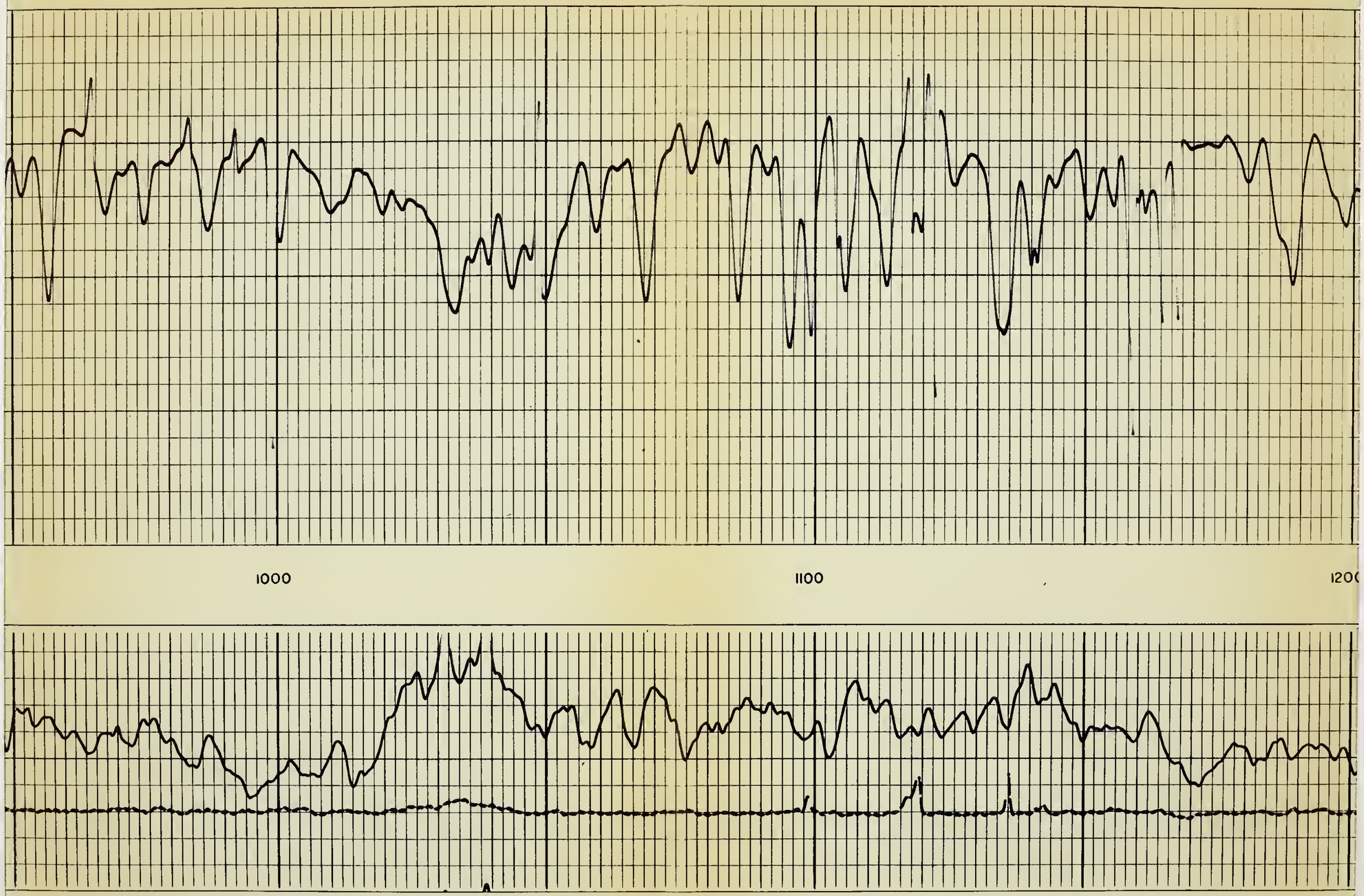
GR

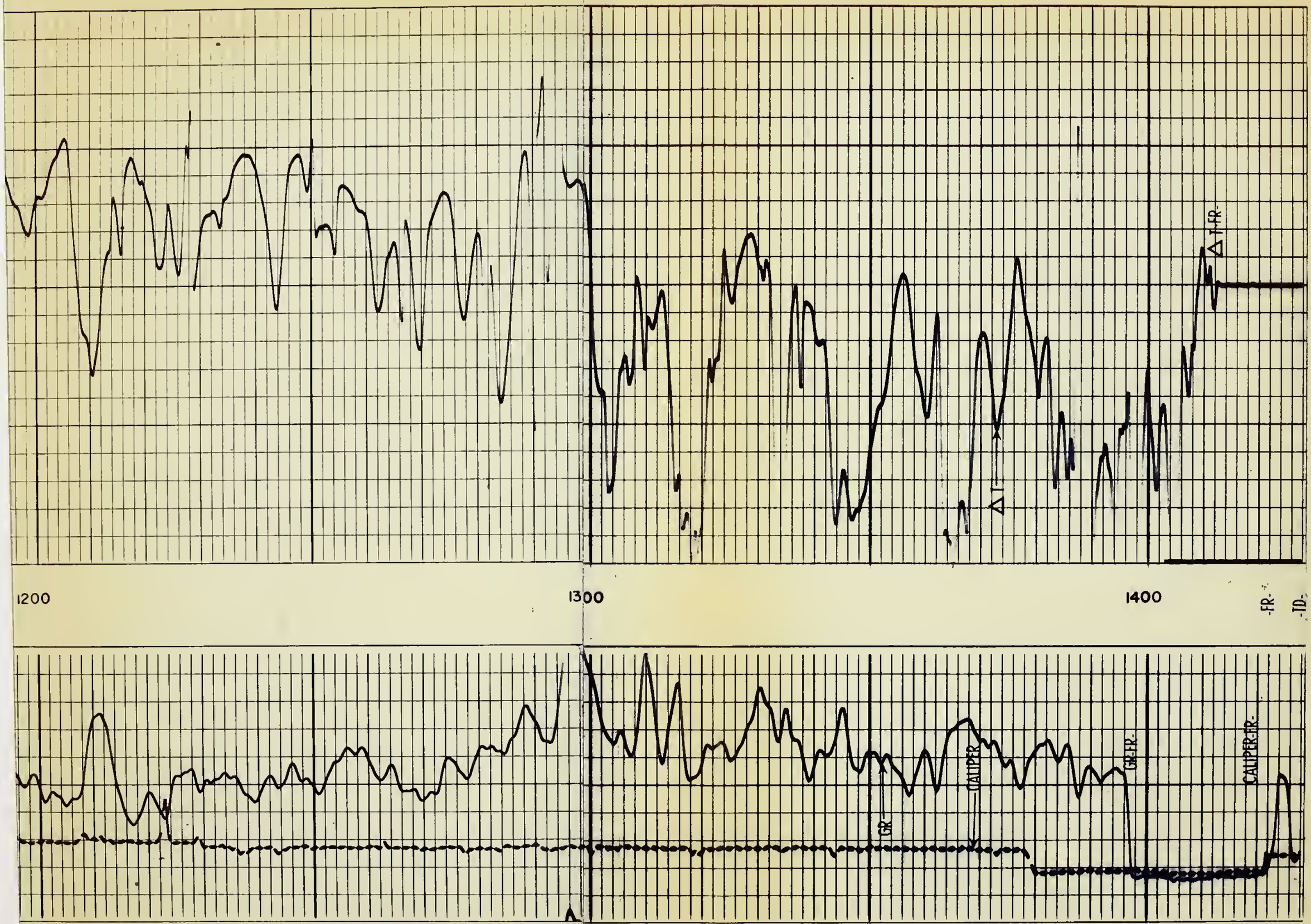
$\Delta t$

0600

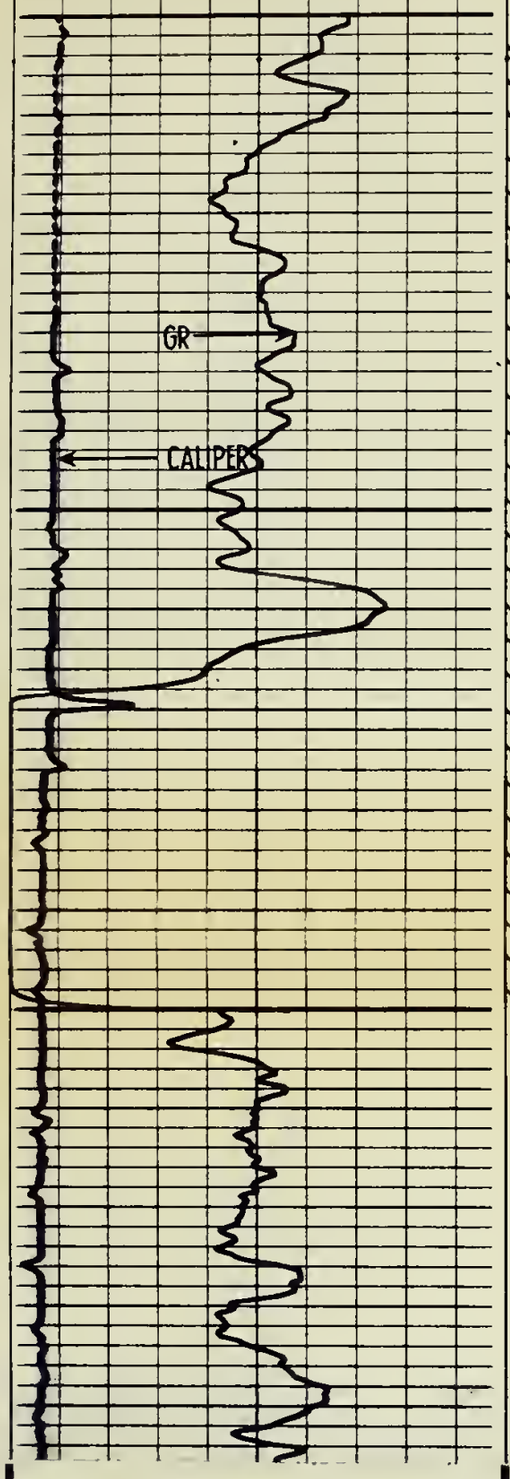
0700


0060
0080

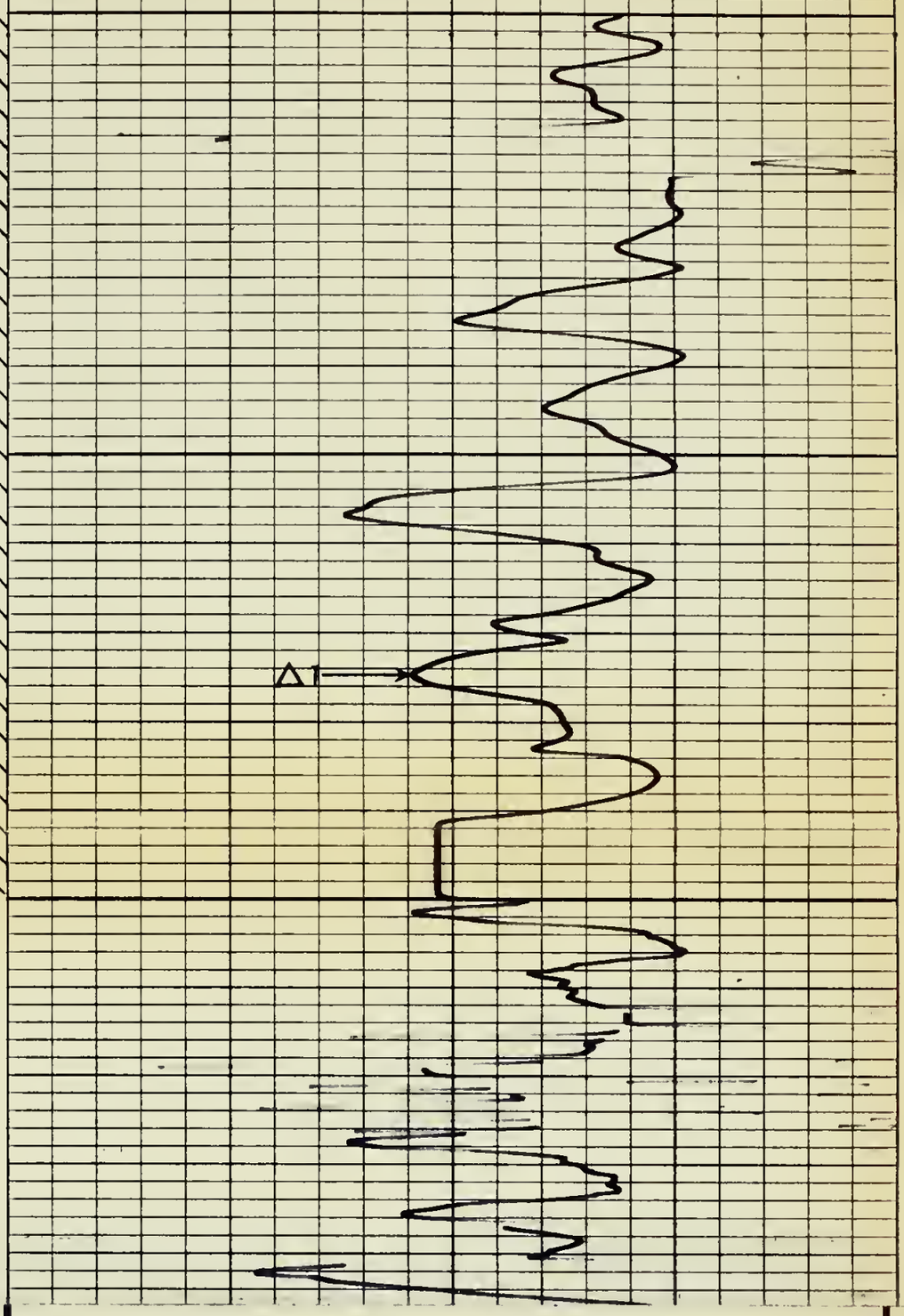

1000
1100
1200


ΔT-FR-
ΔT-
1200
1300
1400
-FR-
-TD-
GR
CALIPER
GR-FR-
CALIPER-FR-

**REPEAT SECTION**




MEMORIZER OUT — CURVES INVALID




4 — 14

**CALIPER**

HOLE DIAM. IN INCHES

0 — 150

150 — 300

**GAMMA RAY**

API UNITS

DEPTHS

T — $R_1$ — $R_2$

150 — 100 — 50

250 — 200 — 150

**INTERVAL TRANSIT TIME**

MICROSECONDS PER FOOT

COMPANY ATLANTIC RICHFIELD

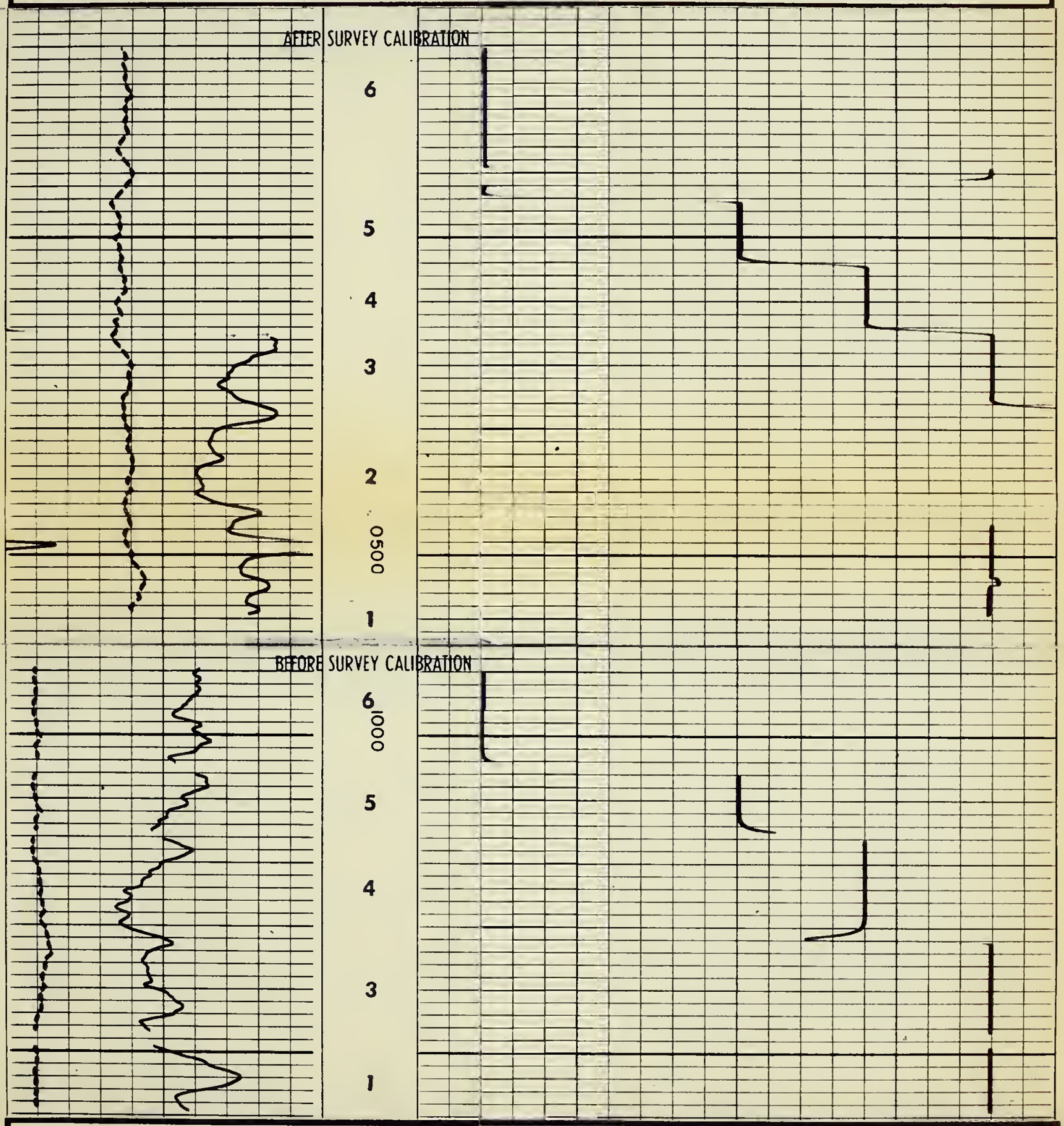
WELL SORGHUM GULCH #13

FIELD SORGHUM GULCH

COUNTY RIO BLANCO STATE COLORADO

SCHL. FR 1422
SCHL. TD 1425
DRLR TD 1430
Elev:
KB ----
DF ----
GL 7383

# CALIBRATION RECORD




## BOREHOLE COMPENSATED SONIC CALIBRATION CODING

1. MECHANICAL ZERO
2. 40 μ SEC/FT
3. 60 μ SEC/FT
4. 80 μ SEC/FT
5. 100 μ SEC/FT
6. 140 μ SEC/FT

WS-730-D

6. 140 μ SEC/FT

0 150

150 300

**GAMMA RAY**

API UNITS

400 200

**TRANSIT TIME**

MICROSECONDS

DEPTHS

**AMPLITUDE** MILLIVOLTS

0 20

FLUID LEVEL

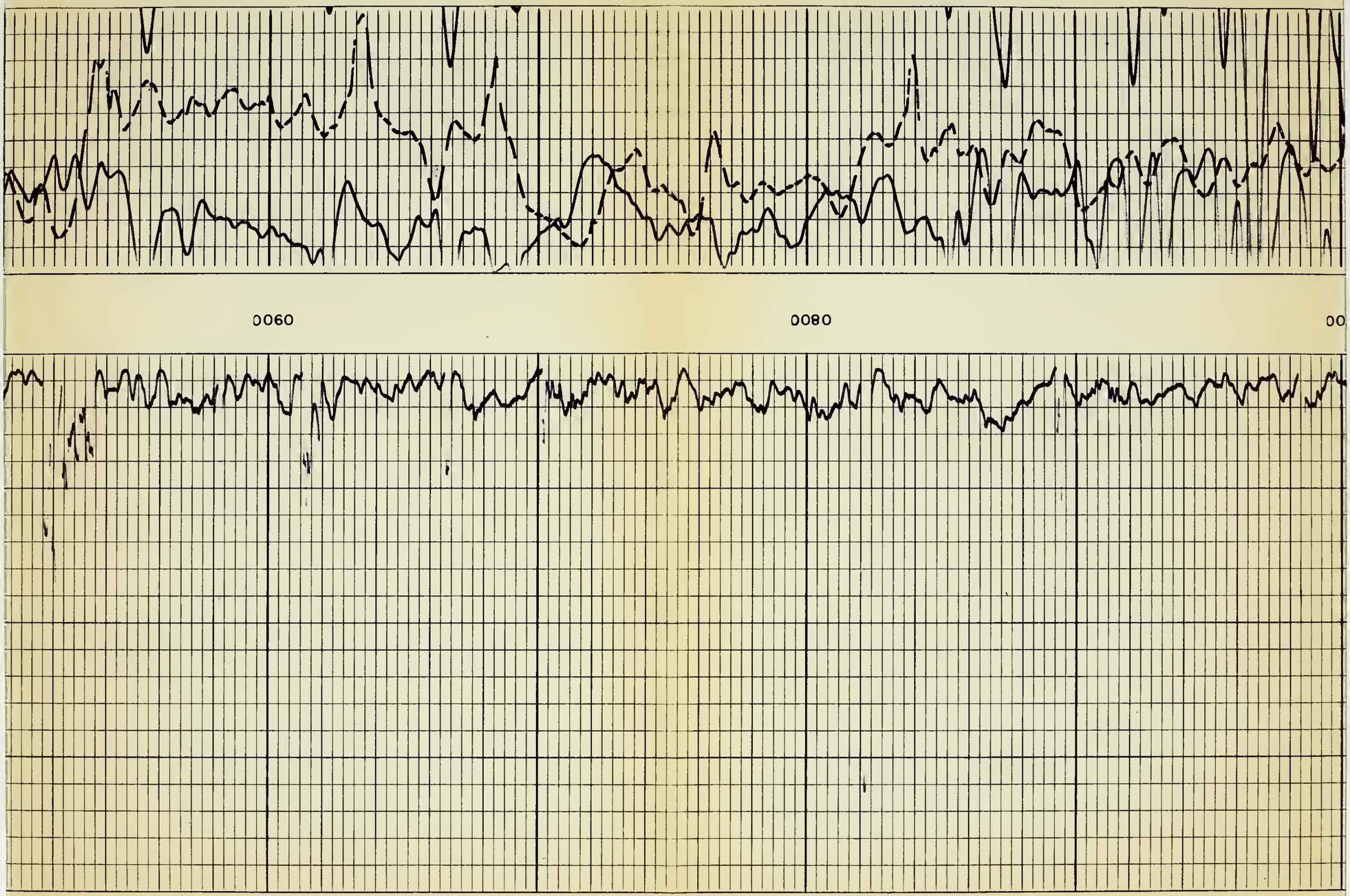
GR

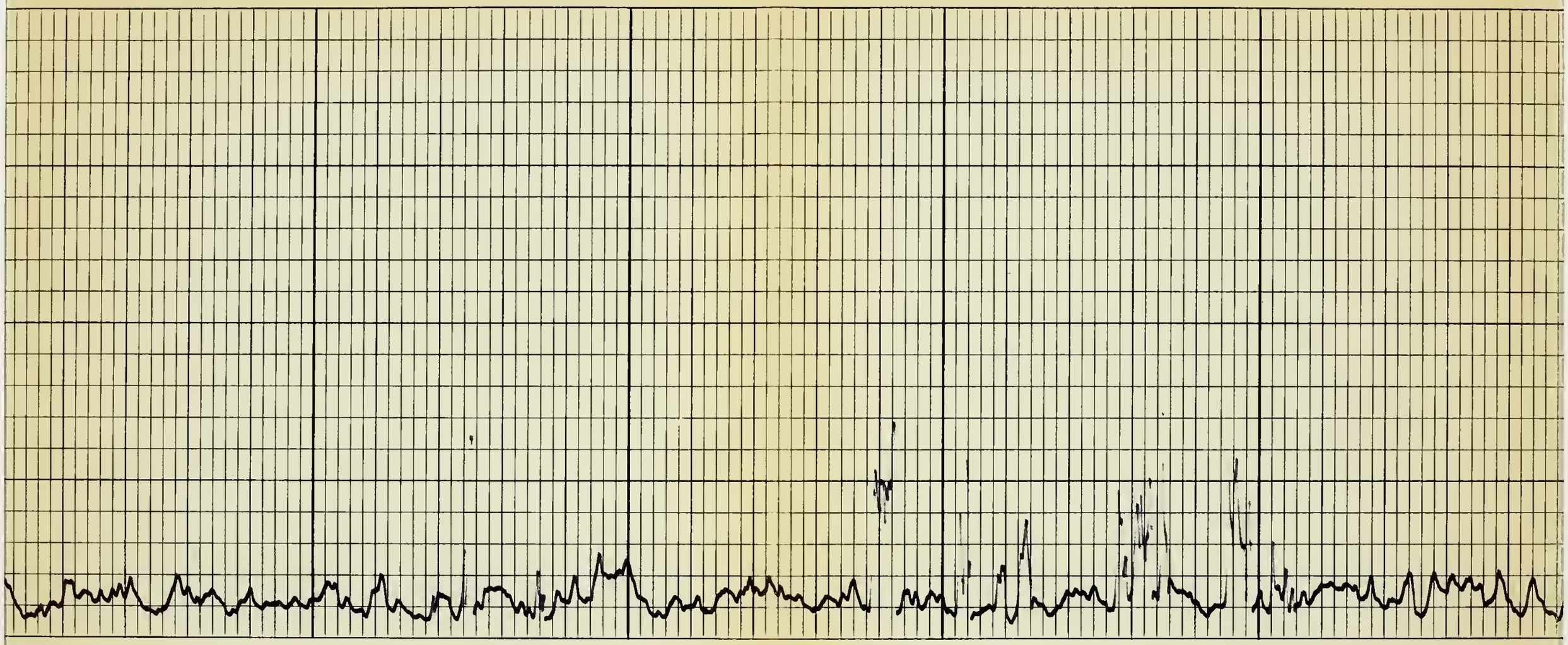
ΔT

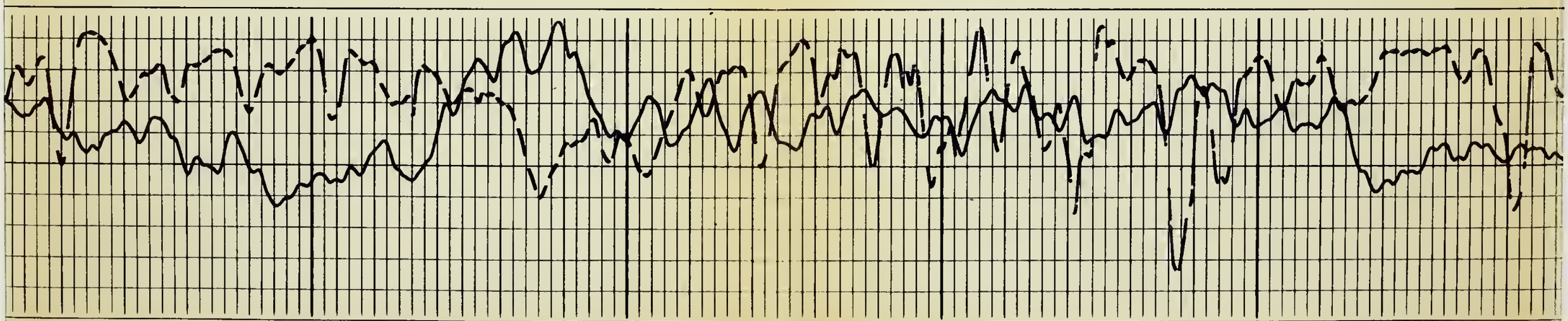
Amp

0600

0700


0060
0080
00


1000
1100
12(



Amp

200

1300

1400

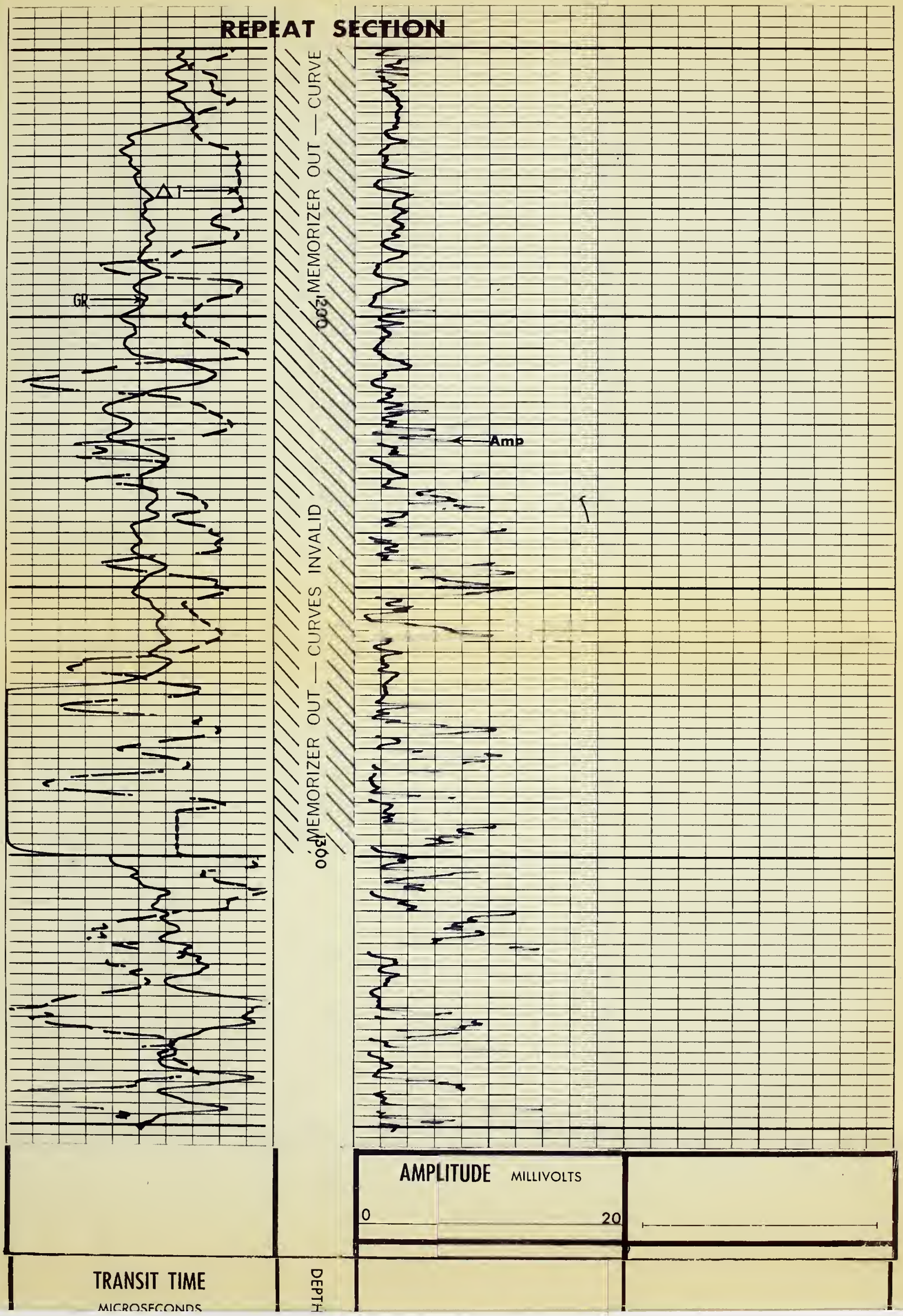
-FR-

-TD-

ΔT

GR

GR-FR-


REPEAT SECTION
MEMORIZER OUT — CURVE
1300
MEMORIZER OUT — CURVES INVALID
1300
ΔI
GR
Amp
AMPLITUDE MILLIVOLTS
0
20
TRANSIT TIME
MICROSECONDS
DEPTH

| MICROSECONDS | THS | | |
|---|---|---|---|
| 400 200 | | | |
| **GAMMA RAY** API UNITS | | | |
| 0 150 | | | |
| 150 300 | | | |

COMPANY ATLANTIC RICHFIELD COMPANY

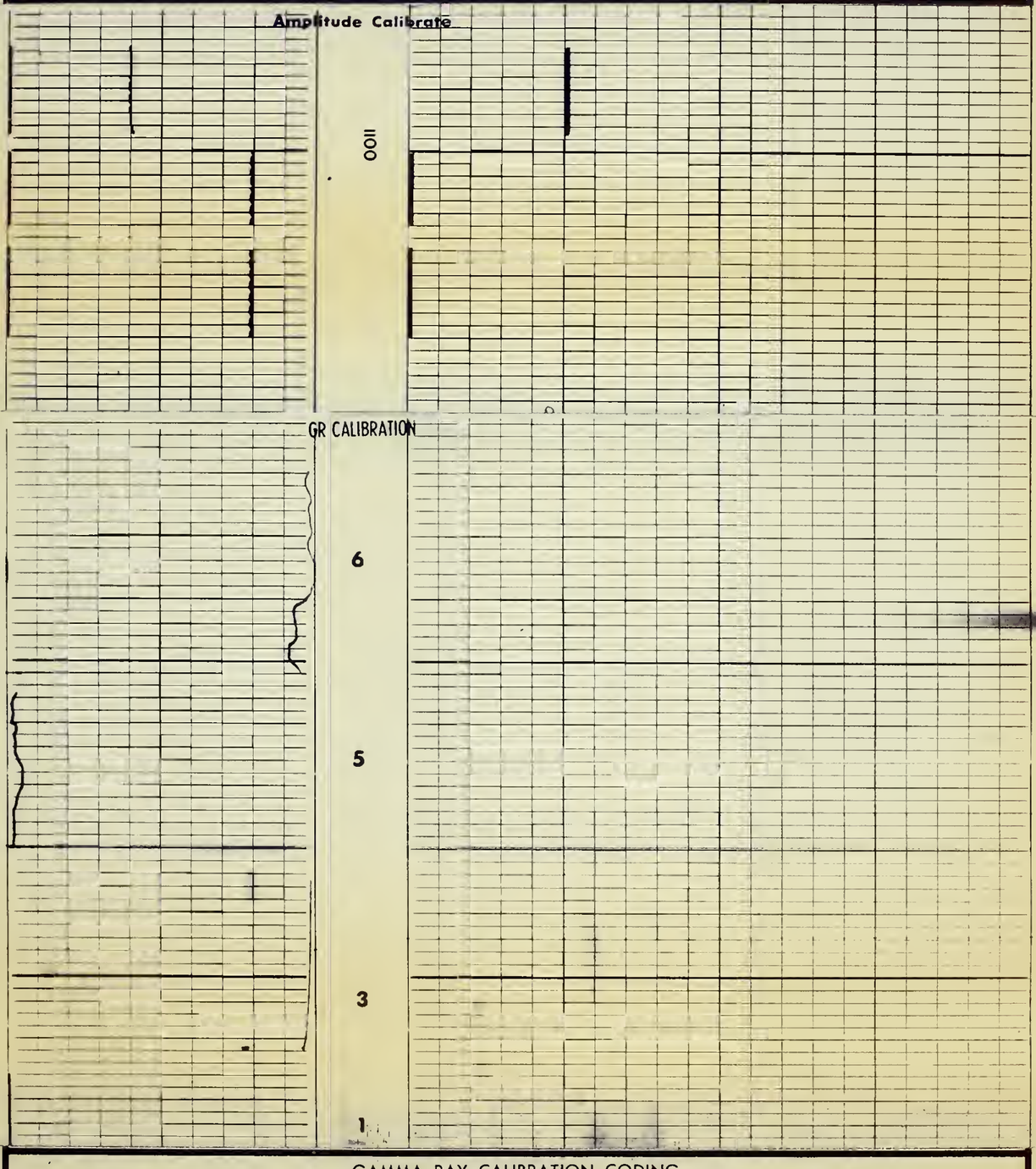
WELL SORGHUM GULCH #18

FIELD SORGHUM GULCH

COUNTY RIO BLANCO STATE COLORADO

SCHL. FR 1422
SCHL. TD 1425
DRLR TD 1430
Elev:
KB ----
DF ----
GL 7383

## CALIBRATION RECORD




GAMMA RAY CALIBRATION CODING

1. MECHANICAL ZERO
2. ELECTRICAL ZERO
3. RECORDER SENSITIVITY
4. MEMORIZER ADJUSTMENT
5. BACKGROUND
6. CALIBRATION


## CALIBRATION RECORD

COMPANY ATLANTIC RICHFIELD COMPANY

WELL SORGHUM GULCH #18

FIELD SORGHUM GULCH

COUNTY RIO BLANCO STATE COLORADO

SCHL. FR 1422
SCHL. TD 1425
DRLR TD 1430
Elev:
KB ----
DF ----
GL 7383

Schlumberger

# LATEROLOG
WITH GAMMA RAY

COUNTY RIO BLANCO
FIELD or LOCATION SORGHUM GULCH
WELL SORGHUM GULCH #18
COMPANY ATLANTIC RICHFIELD

COMPANY ATLANTIC RICHFIELD COMPANY

WELL SORGHUM GULCH #18

FIELD SORGHUM GULCH

COUNTY RIO BLANCO STATE COLORADO

LOCATION
1240' FSL & 366' FEL
Sec. 25 Twp. 3S Rge. 97W

Other Services:
TEMP
BHC-GR
FDC-GR

Permanent Datum: GL, Elev. 7383
Log Measured From GL, - Ft. Above Perm. Datum
Drilling Measured From GL

Elev.: K.B. ----
D.F. ----
G.L. 7383

| | | | | |
|---|---|---|---|---|
| Date | 10-4-74 | | | |
| Run No. | ONE | | | |
| Depth—Driller | 1430 | | | |
| Depth—Logger | 1428 | | | |
| Btm. Log Interval | 1423 | | | |
| Top Log Interval | 529 | | | |
| Casing—Driller | 7 @ 60 | @ | @ | @ |
| Casing—Logger | - | | | |
| Bit Size | 6 1/4 | | | |
| Type Fluid in Hole | WATER | | | |
| | - | | | |
| Dens. \| Visc. | - \| - | | | |
| pH \| Fluid Loss | - \| - ml | ml | ml | ml |
| Source of Sample | - | | | |
| $R_m$ @ Meas. Temp. | - @ °F | @ °F | @ °F | @ °F |
| $R_{mf}$ @ Meas. Temp. | - @ °F | @ °F | @ °F | @ °F |
| $R_m$ @ Meas. Temp. | - @ °F | @ °F | @ °F | @ °F |
| Source: $R_{mf}$ $R_{mc}$ | - \| | \| | \| | \| |
| $R_m$ @ BHT | - @ °F | @ °F | @ °F | @ °F |
| Time Since Circ. | - | | | |
| Max. Rec. Temp. | 82 °F | °F | °F | °F |
| Equip. \| Location | 7674 \| VERNAL | \| | \| | \| |
| Recorded By | HAUGAARD | | | |
| Witnessed By | TAIT | | | |

FOLD HERE

The well name, location and borehole reference data were furnished by the customer.

REMARKS

Scale Changes
Type Log | Depth | Scale Up Hole | Scale Down Hole

Equipment Data
Run No. | Tool Type | Pad Type | Tool Pos. | Other
ONE | LL-7

Changes in Mud Type or Additional Samples
Date | Sample No. | Depth—Driller | Type Fluid in Hole | Dens. | Visc. | pH | Fluid Loss | Source of Sample | $R_m$ @ Meas. Temp. | $R_{mf}$ @ Meas. Temp. | $R_{mc}$ @ Meas. Temp. | Source: $R_{mf}$ | $R_{mc}$ | $R_m$ @ BHT | $R_{mf}$ @ BHT | $R_{mc}$ @ BHT

Equip. Used: CART. No. ----
PANEL No. LLP-D 790-E FFU-G 752
SONDE No.
Spacing: BEAM WIDTH:
GUARD LENGTH:
SERVICE ORDER # 21443

RESISTIVITY
ohms. $m^2/m$

LATEROLOG
10 | 100 | 1000 | 10000 | 20000

Depths
2

SPONTANEOUS POTENTIAL
millivolts

- 20 MV +

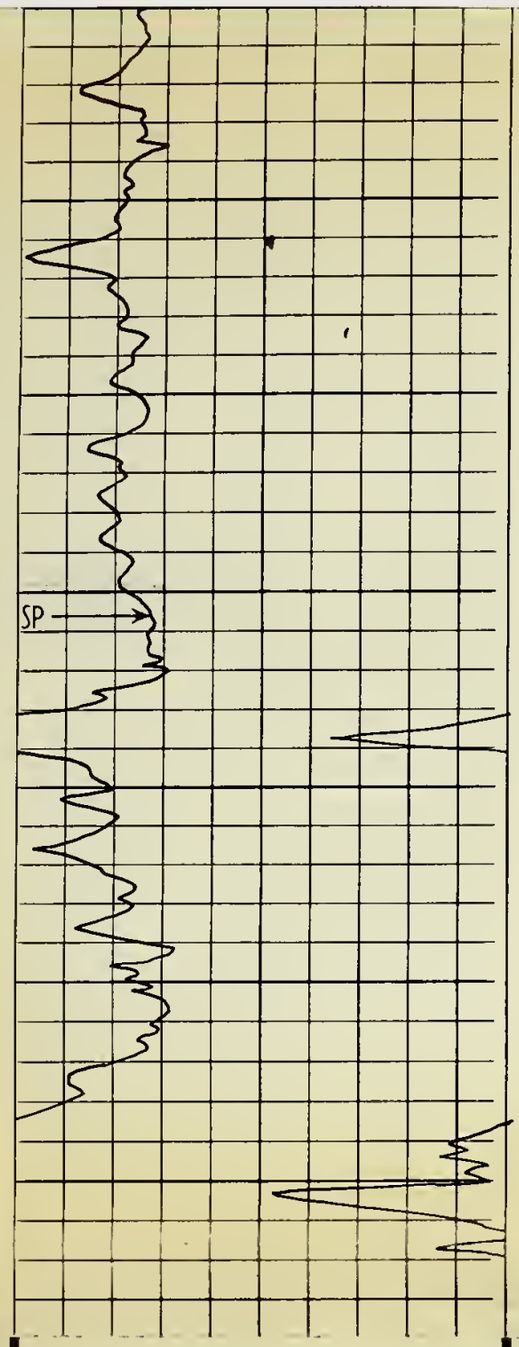
SWS-1366-F

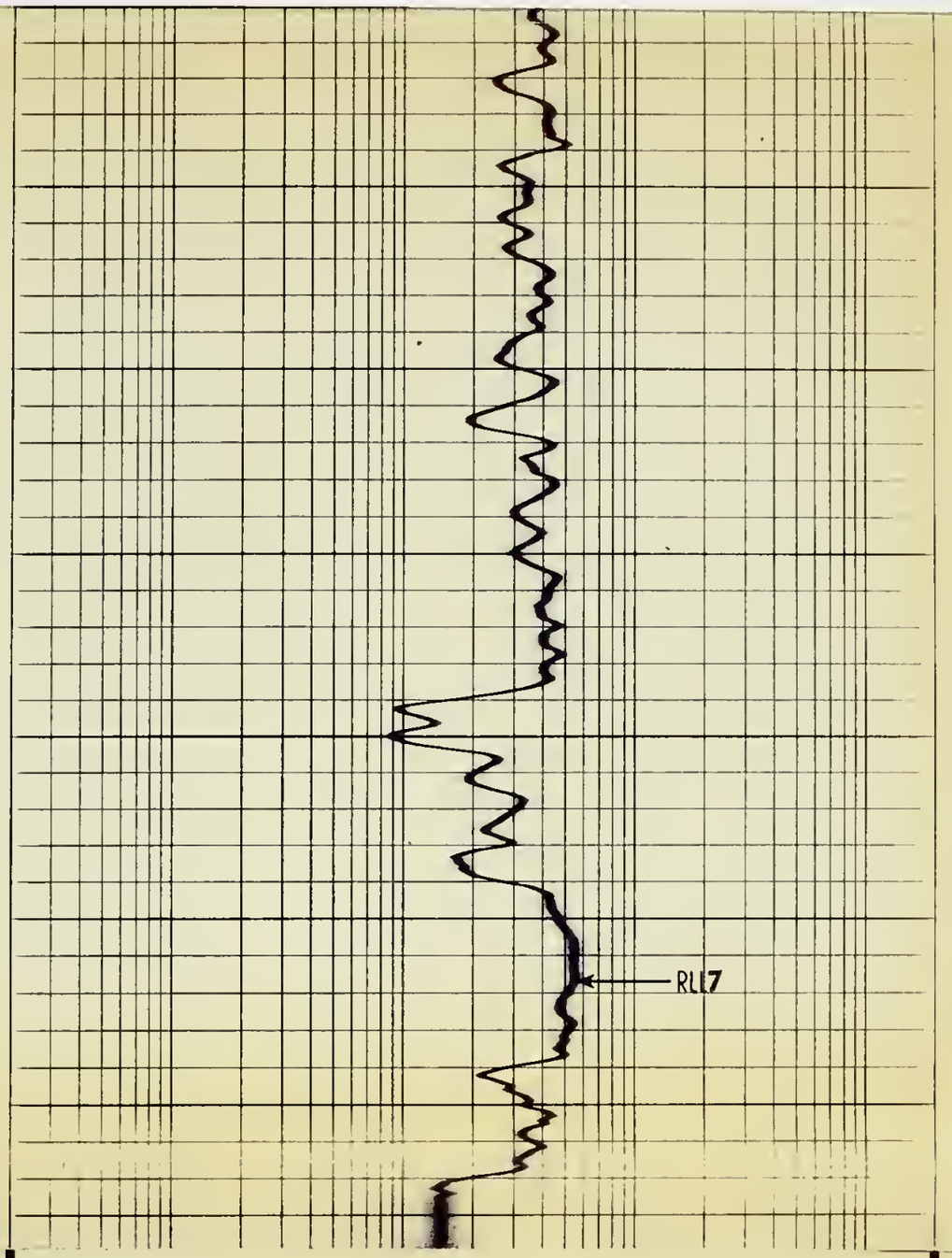
RLL7

FLUID LEVEL

SP

0500 0600 0700 0800 0900 1000 1100




0

1200

1300

1400

-FR-
-TD-

LATEROLOG

2.0 10 100 1000 10000 20000

+ 20 MV −

**SPONTANEOUS-POTENTIAL**
MILLIVOLTS

DEPTHS

**RESISTIVITY**
OHMS. M²/M

## DETAIL LOG
**5″ = 100′**

**SPONTANEOUS-POTENTIAL**
MILLIVOLTS

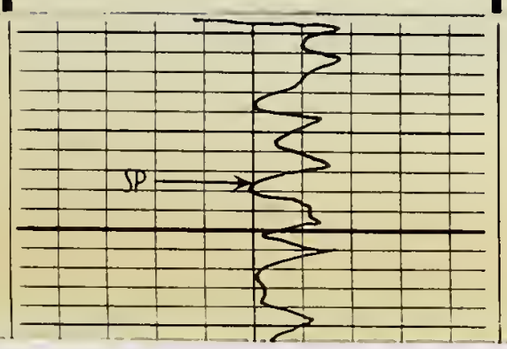
DEPTHS

**RESISTIVITY**
OHMS. M²/M

LATEROLOG

− 20 MV +

2.0 10 100 1000 10000 20000



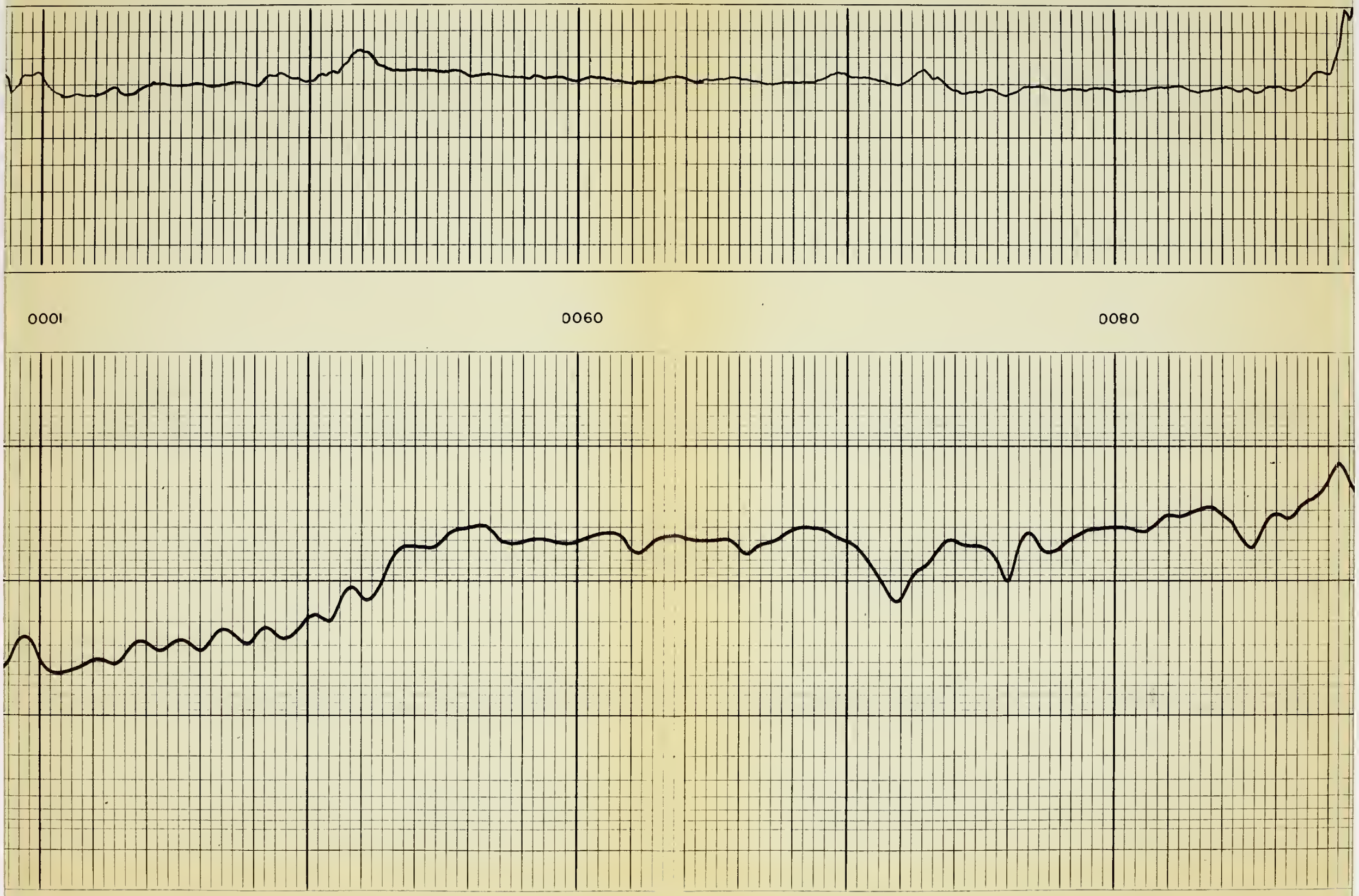

0500

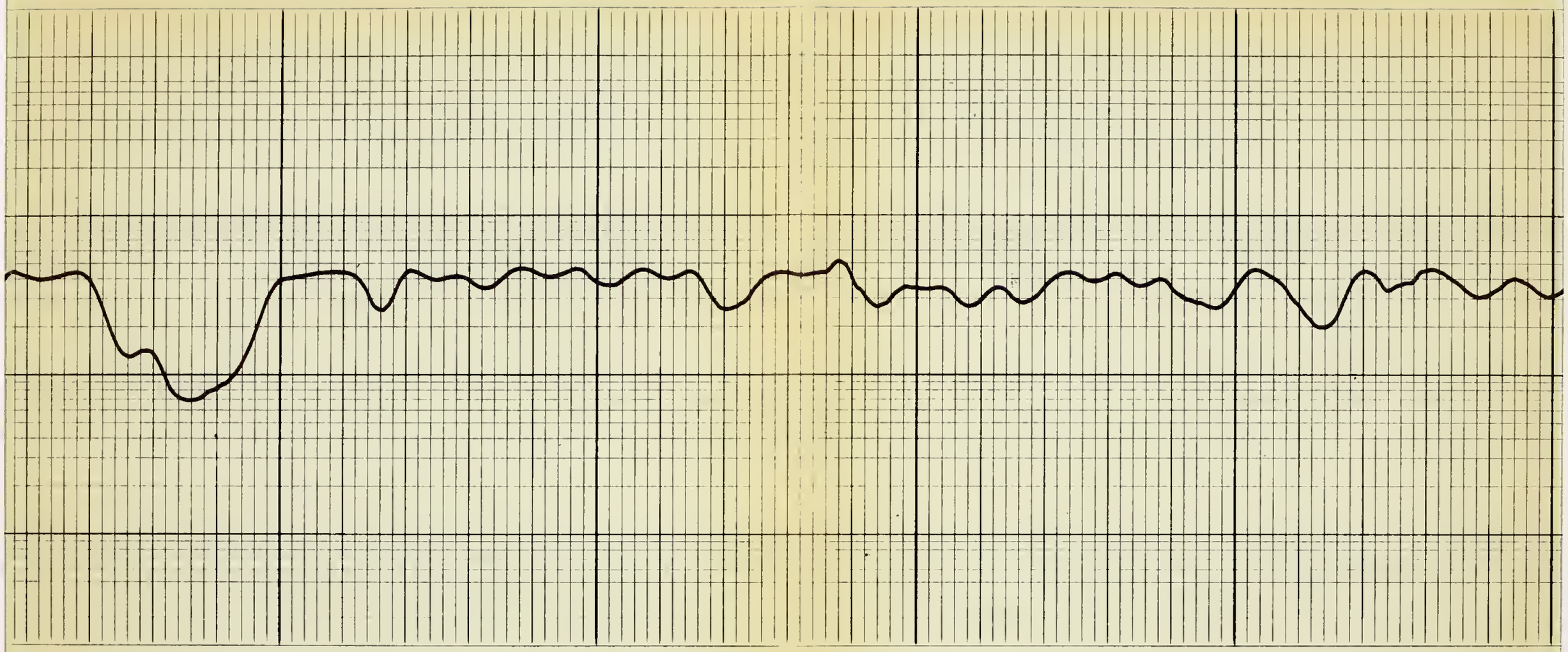
RU17

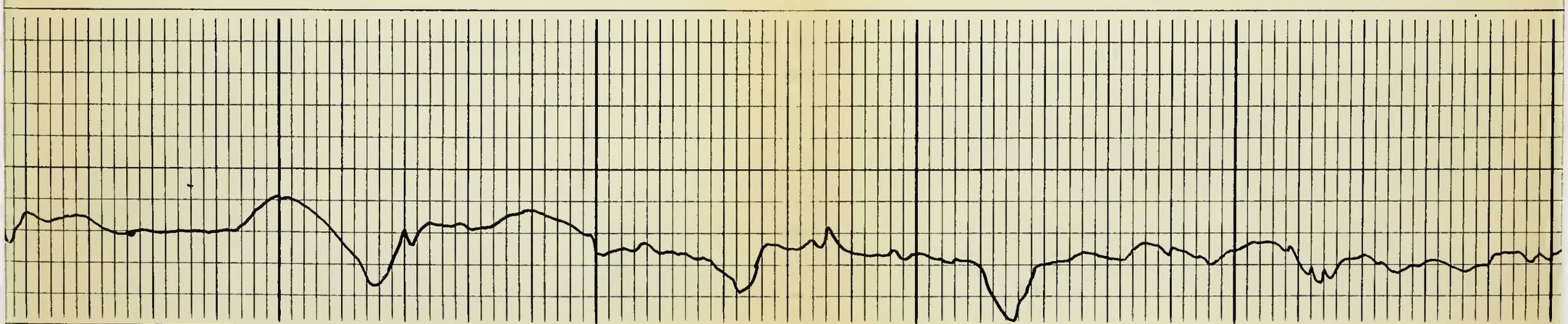
FLUID LEVEL

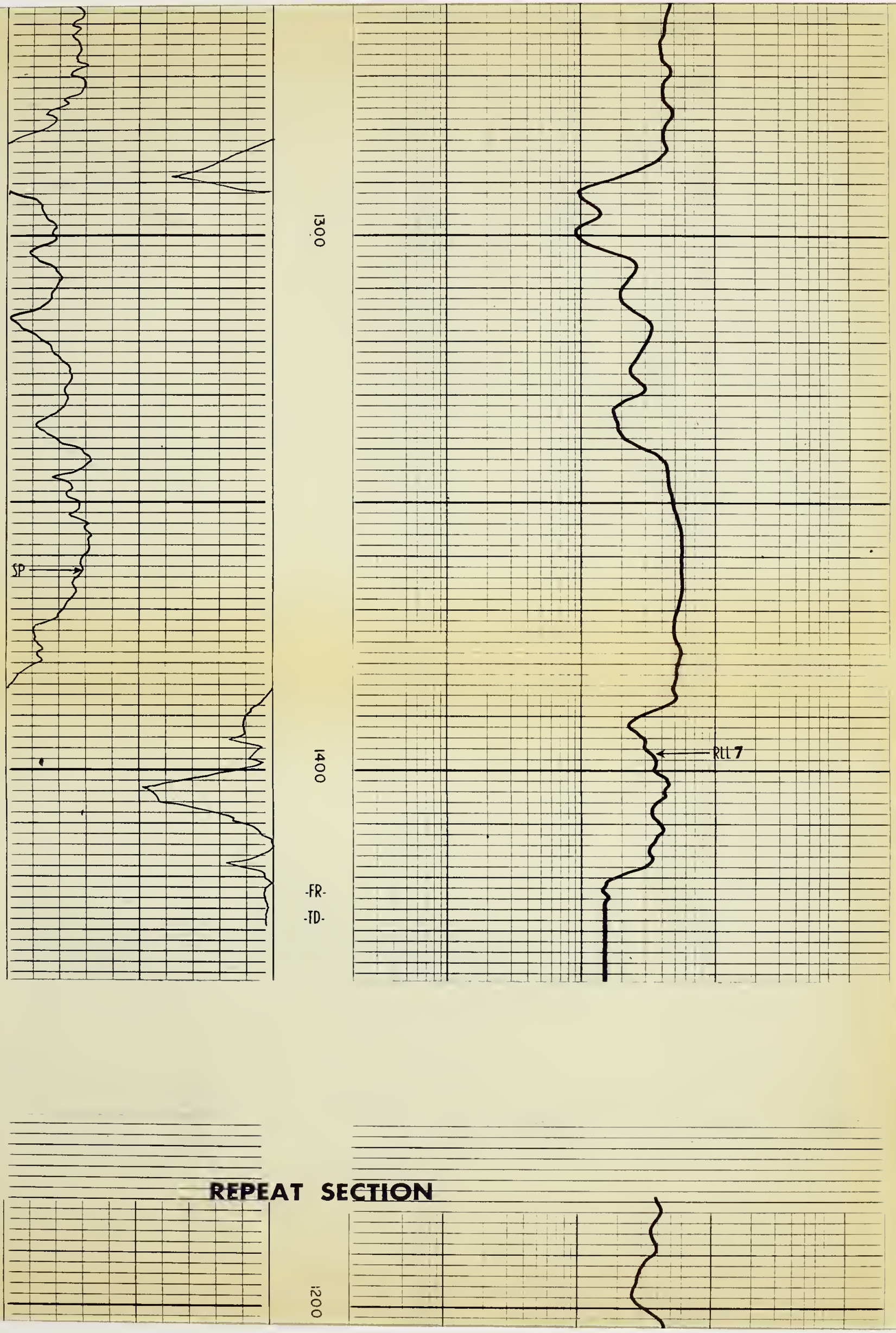
0600

0700

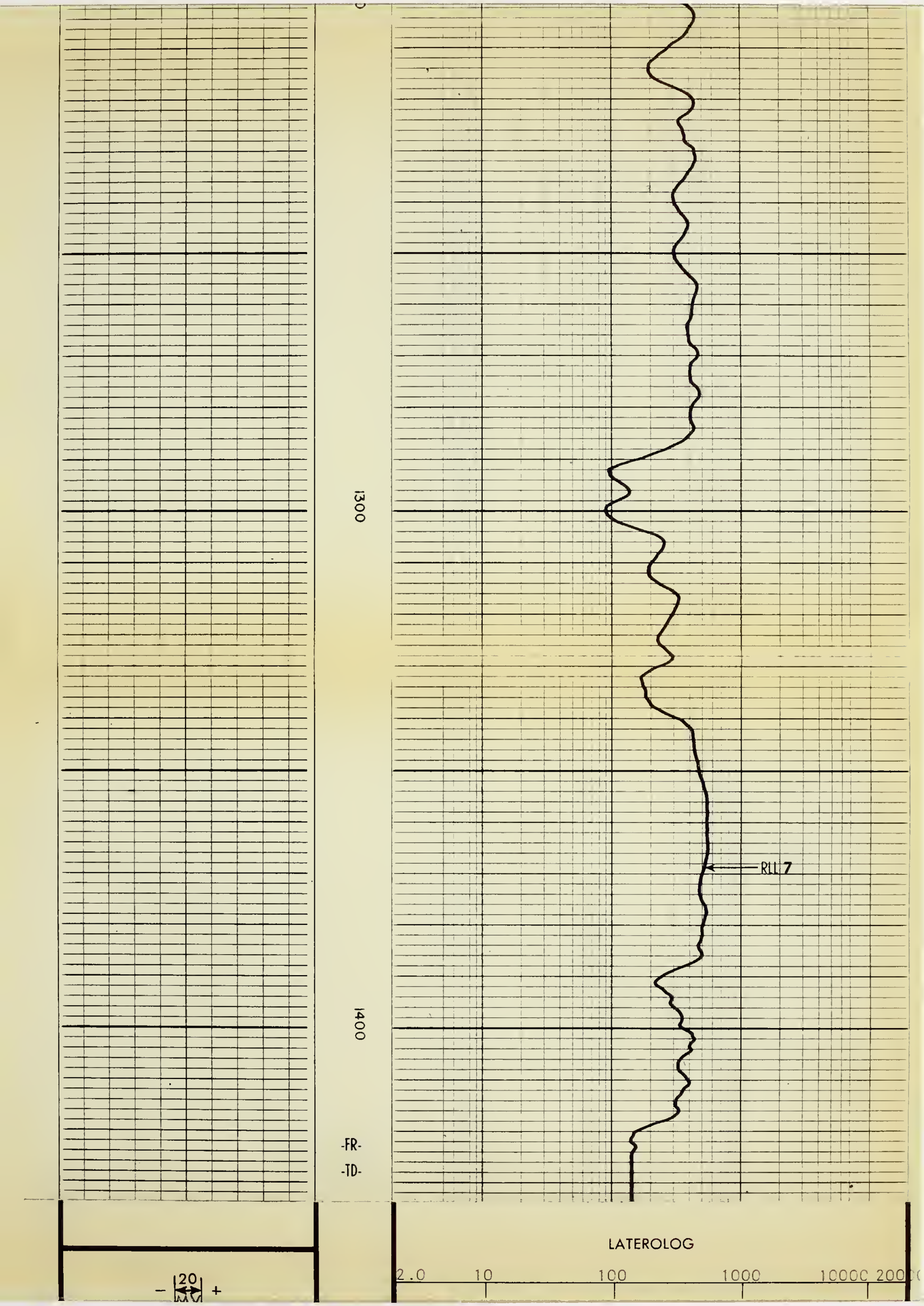

0001
0060
0080


1100
1200






**REPEAT SECTION**


1300
1400
-FR-
-TD-
RLL 7
LATEROLOG
2.0
10
100
1000
10000
20
MV

| SPONTANEOUS-POTENTIAL<br>MILLIVOLTS | DEPTHS | RESISTIVITY<br>OHMS. M²/M |
|---|---|---|

COMPANY ATLANTIC RICHFIELD COMPANY

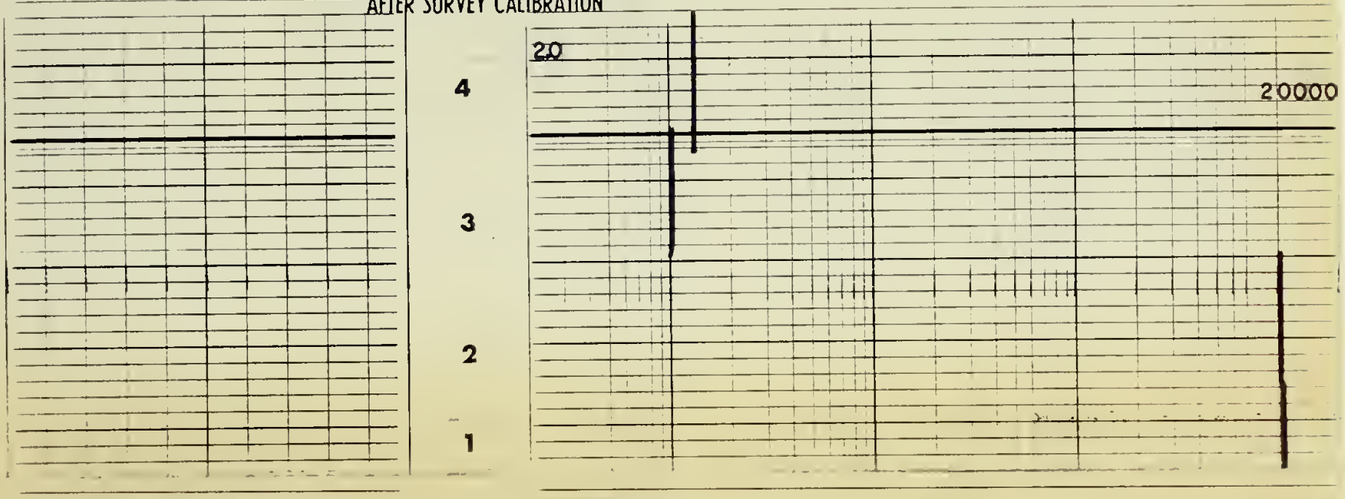
WELL SORGHUM GULCH #18

FIELD SORGHUM GULCH

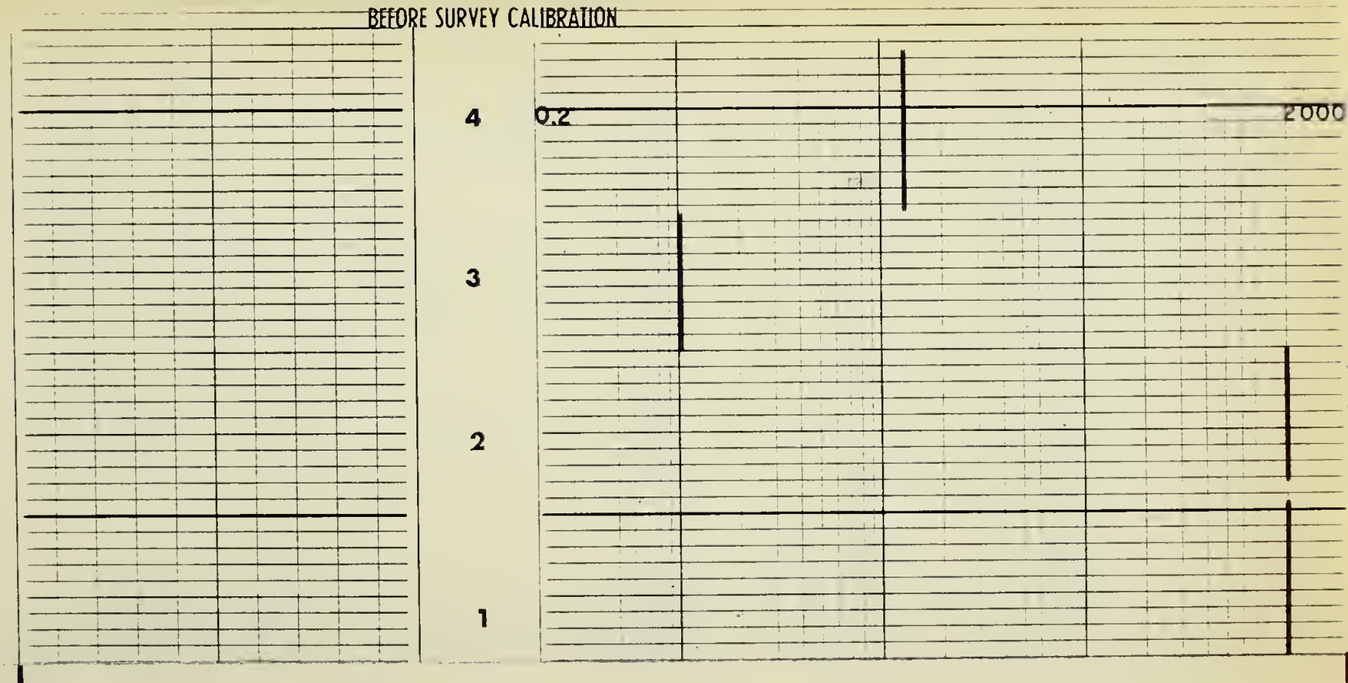
COUNTY RIO BLANCO STATE COLORADO

SCHL. FR 1423
SCHL. TD 1428
DRLR TD 1430
Elev:
KB -----
DF -----
GL 7383

AFTER SURVEY CALIBRATION




BEFORE SURVEY CALIBRATION




LATEROLOG CALIBRATION CODING

1. MECHANICAL ZERO
2. TEST-1 (1000 OHM-M)
3. TEST-2 (1 OHM-M)
4. TOOL CAL. (13.4 OHM-M)

## CALIBRATION RECORD

COMPANY ATLANTIC RICHFIELD COMPANY

WELL SORGHUM GULCH #18

FIELD SORGHUM GULCH

COUNTY RIO BLANCO STATE COLORADO

SCHL. FR 1423
SCHL. TD 1428
DRLR TD 1430
Elev:
KB -----
DF -----
GL 7383

Schlumberger

# COMPENSATED FORMATION DENSITY LOG

Gamma-Gamma

COUNTY RIO BLANCO
FIELD or LOCATION SORGHUM GULCH
WELL SORGHUM GULCH #18
COMPANY ATLANTIC RICHFIELD

COMPANY ATLANTIC RICHFIELD COMPANY

WELL SORGHUM GULCH #18

FIELD SORGHUM GULCH

COUNTY RIO BLANCO STATE COLORADO

Location:
1240' FSL & 366' FEL
Sec. 25 Twp. 3S Rge. 97W

Other Services:
TEMP
BHC-GR
LL-7

Permanent Datum: GL ; Elev.: 7383
Log Measured From GL , 0 Ft. Above Perm. Datum
Drilling Measured From GL

Elev.: K.B. ----
D.F. ----
G.L. 7383

| | | | | |
|---|---|---|---|---|
| Date | 10-5-74 | | | |
| Run No. | ONE | | | |
| Depth—Driller | 1430 | | | |
| Depth—Logger | 1423 | | | |
| Btm. Log Interval | 1422 | | | |
| Top Log Interval | 64 | | | |
| Cosing—Driller | 7 @60 | @ | @ | @ |
| Casing—Lagger | 64 | | | |
| Bit Size | 4 7/8 | | | |
| Type Fluid in Hole | WATER | | | |
| Fluid Level | 529 | | | |
| Dens. / Visc. | - / - | | | |
| pH / Fluid Los | - / - ml | ml | ml | ml |
| Source of Sample | - | | | |
| $R_m$ @ Meos. Temp. | - @ - °F | @ °F | @ °F | @ °F |
| $R_{mf}$ @ Meos. Temp. | - @ - °F | @ °F | @ °F | @ °F |
| $R_{mc}$ @ Meos. Temp. | - @ - °F | @ °F | @ °F | @ °F |
| Source: $R_{mf}$ / $R_{mc}$ | - / - | | | |
| $R_m$ @ BHT | - @ - °F | @ °F | @ °F | @ °F |
| Time Since Circ. | - | | | |
| Max. Rec. Temp. | 82 °F | °F | °F | °F |
| Equip. / Location | 7674 / VRNL | | | |
| Recarded By | HAUGAARD | | | |
| Witnessed By | TAIT | | | |

FOLD HERE

The well name, location and borehole reference data were furnished by the customer

**SCALE CHANGES**

| Type Log | Depth | Scale Up Hole | Scale Down Hole |
|---|---|---|---|
| | | | |

**CHANGES IN MUD TYPE OR ADDITIONAL SAMPLES**

| | | | | |
|---|---|---|---|---|
| Date / Sample No. | | | | |
| Depth - Driller | | | | |
| Type Fluid | | | | |
| Source of Sample | | | | |
| $R_m$ @ Meos. Temp. | @ °F | @ °F | @ °F | @ °F |
| $R_{mf}$ @ Meos. Temp. | @ °F | @ °F | @ °F | @ °F |
| $R_{mc}$ @ Meas. Temp. | @ °F | @ °F | @ °F | @ °F |
| $R_m$ @ BHT | @ °F | @ °F | @ °F | @ °F |
| Dens. / Visc. | | | | |
| ph / Fluid Lass | ml | ml | ml | ml |
| % Water by Val. | | | | |
| % Oil by Vol. | | | | |
| % Solids by Val. | | | | |
| Solids Av. Sp. Gr. | | | | |

**LOGGING DATA**

FDC Selectors

| Grain Density | Hole Fluid | Porosity Scale | Fram | To |
|---|---|---|---|---|
| | | | | |

| Liquid Density | | | | |
|---|---|---|---|---|
| | | | | |

**EQUIPMENT DATA**

| | | | | |
|---|---|---|---|---|
| Run No. | ONE | | | |
| Panel No. | EA 355 | | | |
| Cart No. | EA 333 | | | |
| Skid No. | D 549 | | | |
| Sonde No. | EB 235 | | | |
| Source | B 2940 | | | |
| Colibrator | 106 545 | | | |
| GR Cort. | E 98 | | | |
| TTR | - | | | |
| Mem Panel | AC 173 | | | |

**REMARKS**

Service Order No. · 21443
API Serial No. · 05103 06128
FILM SPLICED @1200

**BIT SIZE/CASING DATA**

| Bit | From | To | Csg. Size | Csg. Wt. | From | To |
|---|---|---|---|---|---|---|
| 6 1/4 | 60 | 1380 | 7 | | GL | 60 |
| 4 7/8 | 1380 | 1430 | | | | |

## CALIBRATION DATA

| Run No. | Gomma Roy | | | FDC — Before Log — ACPS | | FDC — After Lag — ACPS | |
|---|---|---|---|---|---|---|---|
| | API Scale | Background CPS | Total CPS | $P_1$ | $P_2$ | $P_1$ | $P_2$ |
| 1 | 0-150 | 30 | 340 | 359 | 629 | 363 | 629 |
| 2 | | | | | | | |
| 3 | | | | | | | |
| 4 | | | | | | | |

All interpretatians are apinians based on inferences from electrical ar other measurements and we cannat, and da nat guarantee the accuracy ar carrectness of any interpretotians, and we shall not, except in the case af grass òr willful negligence an our part, be liable or respansible for ony lass, costs, damages or expenses incurred or sustained by anyane resulting fram any interpretation made by any af aur afficers, agents ar employees. These interpretations are alsa subject to Clause 7 af aur General Terms and Canditians as set aut in aur current Price Schedule.

**CALIPER**
HOLE DIAM. IN INCHES

4 — 14

DEPTHS

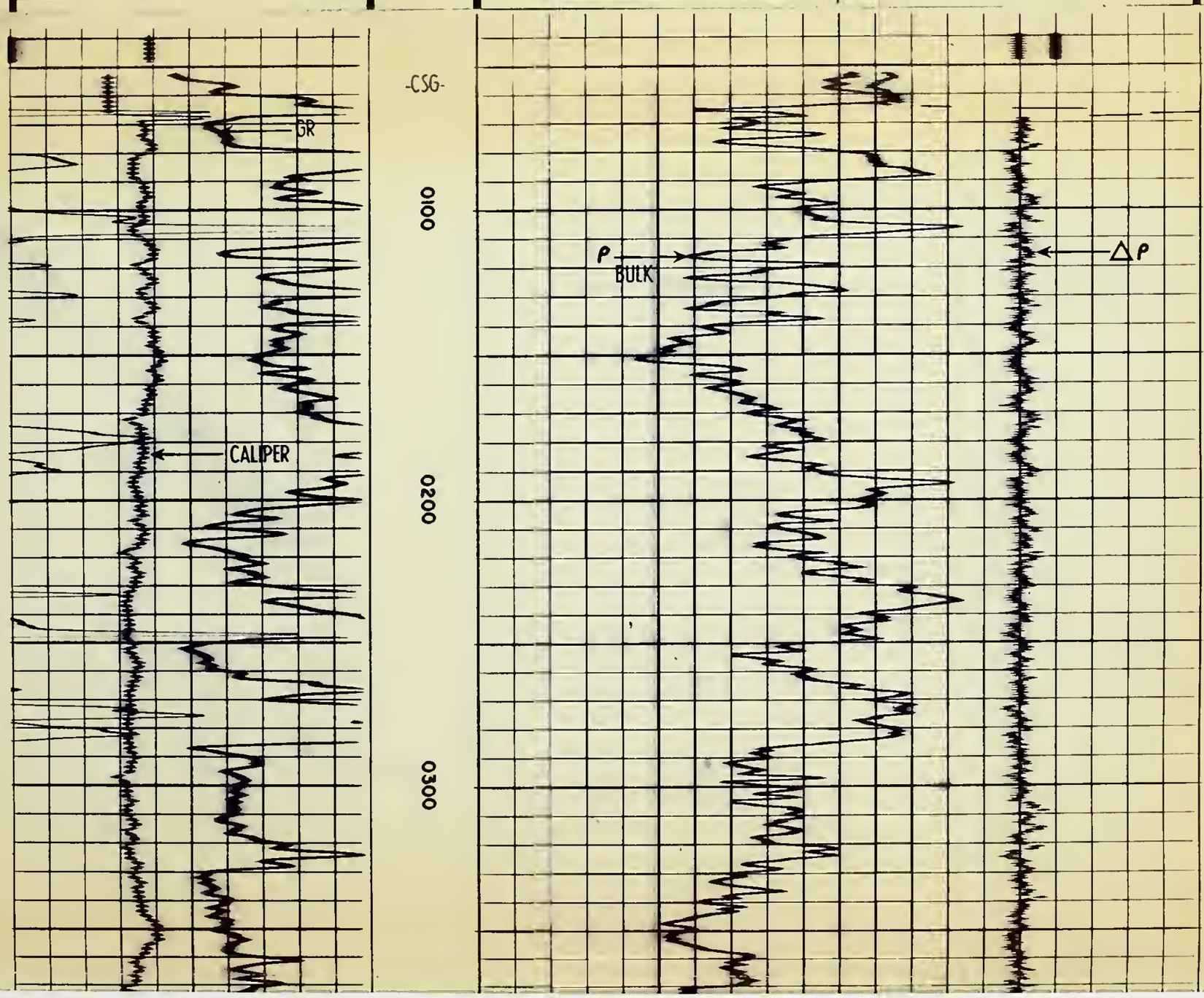
—.25 — 0 — +.25
**CORRECTION**
GRAMS/CC.

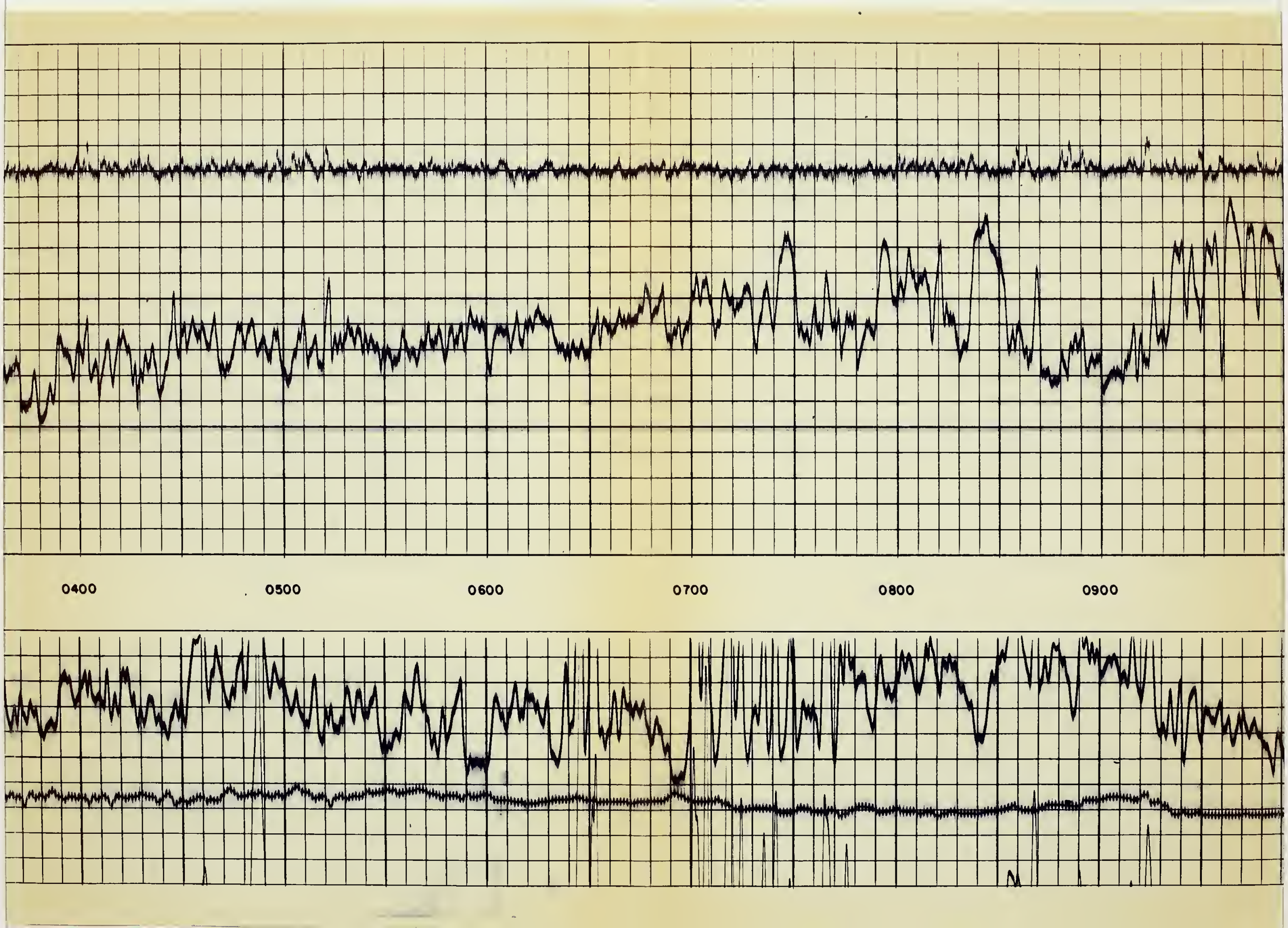
**GAMMA RAY**
API UNITS

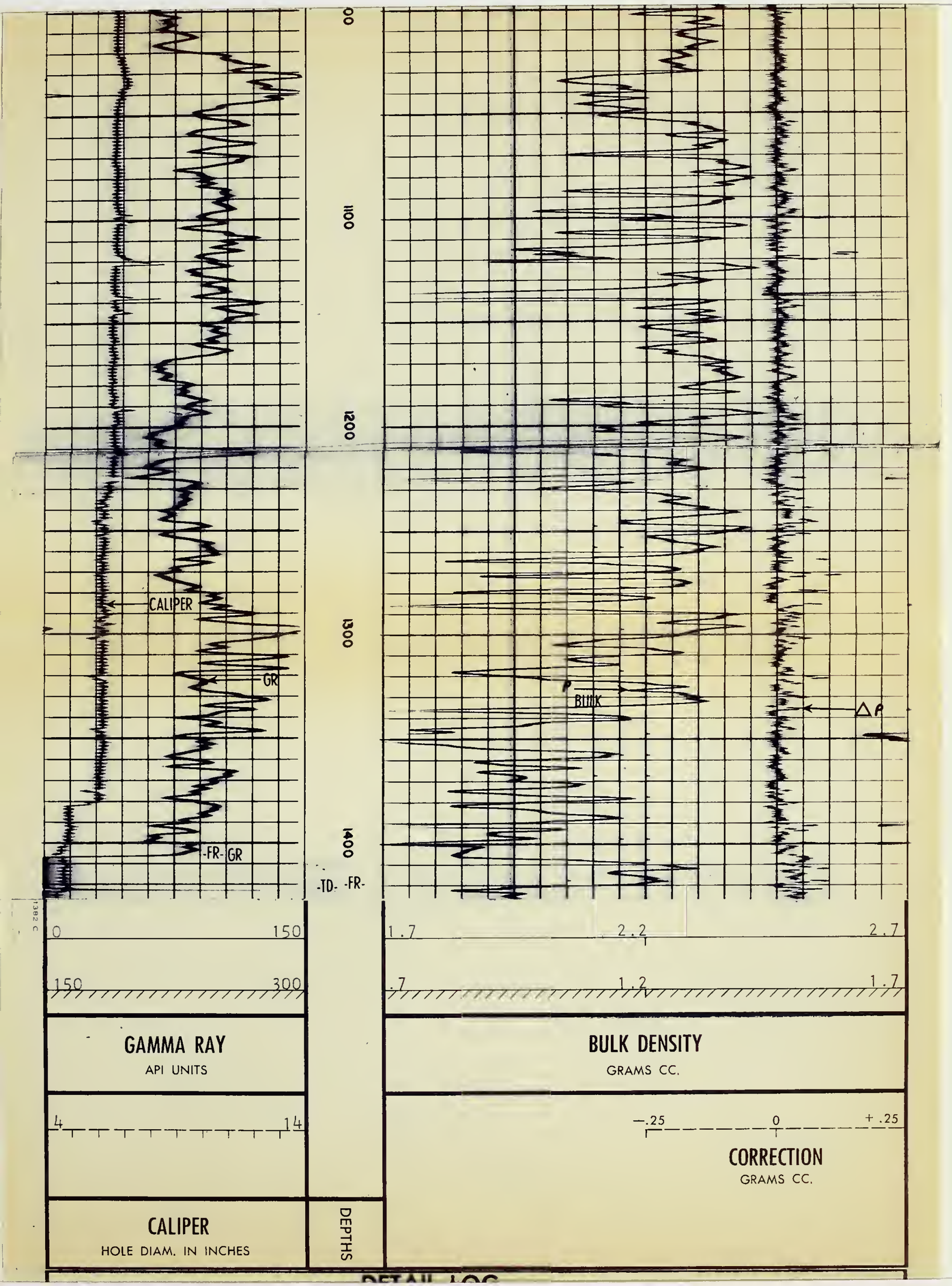
0 — 150
150 — 300

**BULK DENSITY**
GRAMS CC.

1.7 — 2.2 — 2.7
.7 — 1.2 — 1.7




0400
0500
0600
0700
0800
0900



CALIPER
GR
-FR- GR
-TD- -FR-
1100
1200
1300
1400
0
150
150
300
GAMMA RAY
API UNITS
4
14
CALIPER
HOLE DIAM. IN INCHES
DEPTHS
1.7
2.2
2.7
.7
1.2
1.7
BULK DENSITY
GRAMS CC.
-.25
0
+.25
CORRECTION
GRAMS CC.

# DETAIL LOG
5" = 100'

## CALIPER
HOLE DIAM. IN INCHES

4 — 14

DEPTHS

-CSG-

0100

0200

## CORRECTION
GRAMS CC.

−.25 — 0 — +.25

## GAMMA RAY
API UNITS

0 — 150

150 — 300

CALIPER

GR

## BULK DENSITY
GRAMS CC.

1.7 — 2.2 — 2.7

.7 — 1.2 — 1.7

$\rho_{BULK}$

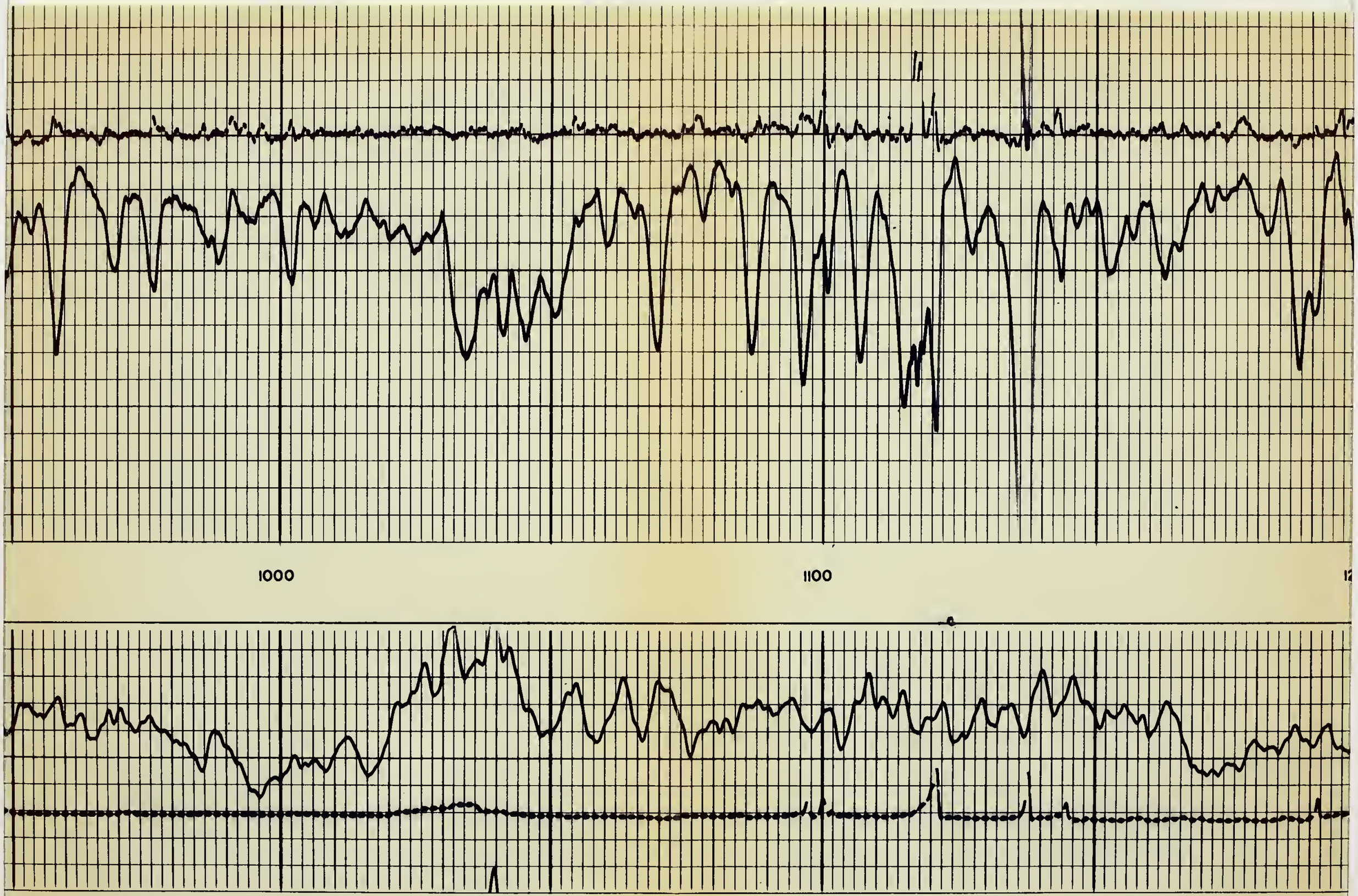
$\Delta\rho$

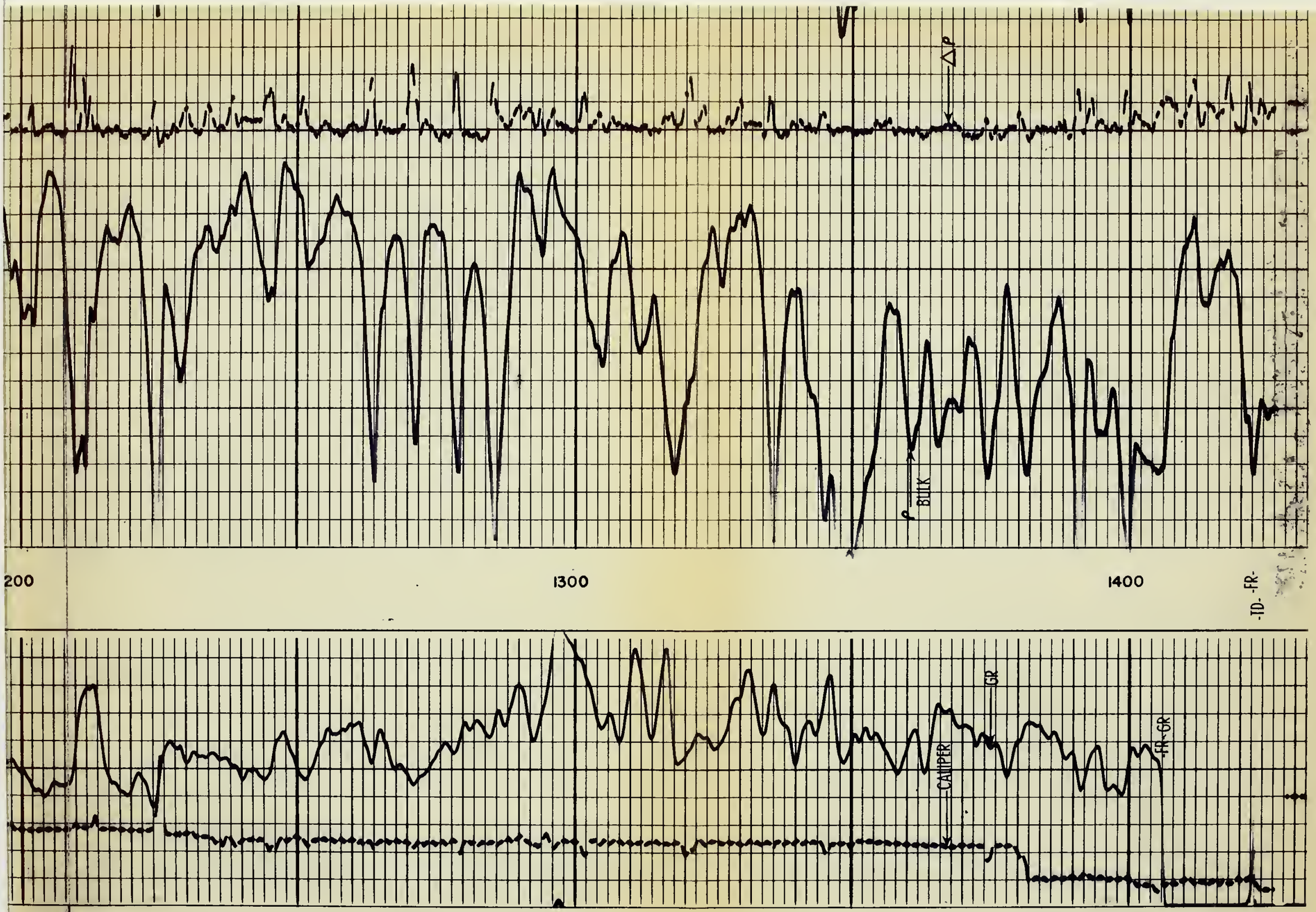
0300

0400

0500
0600
0700

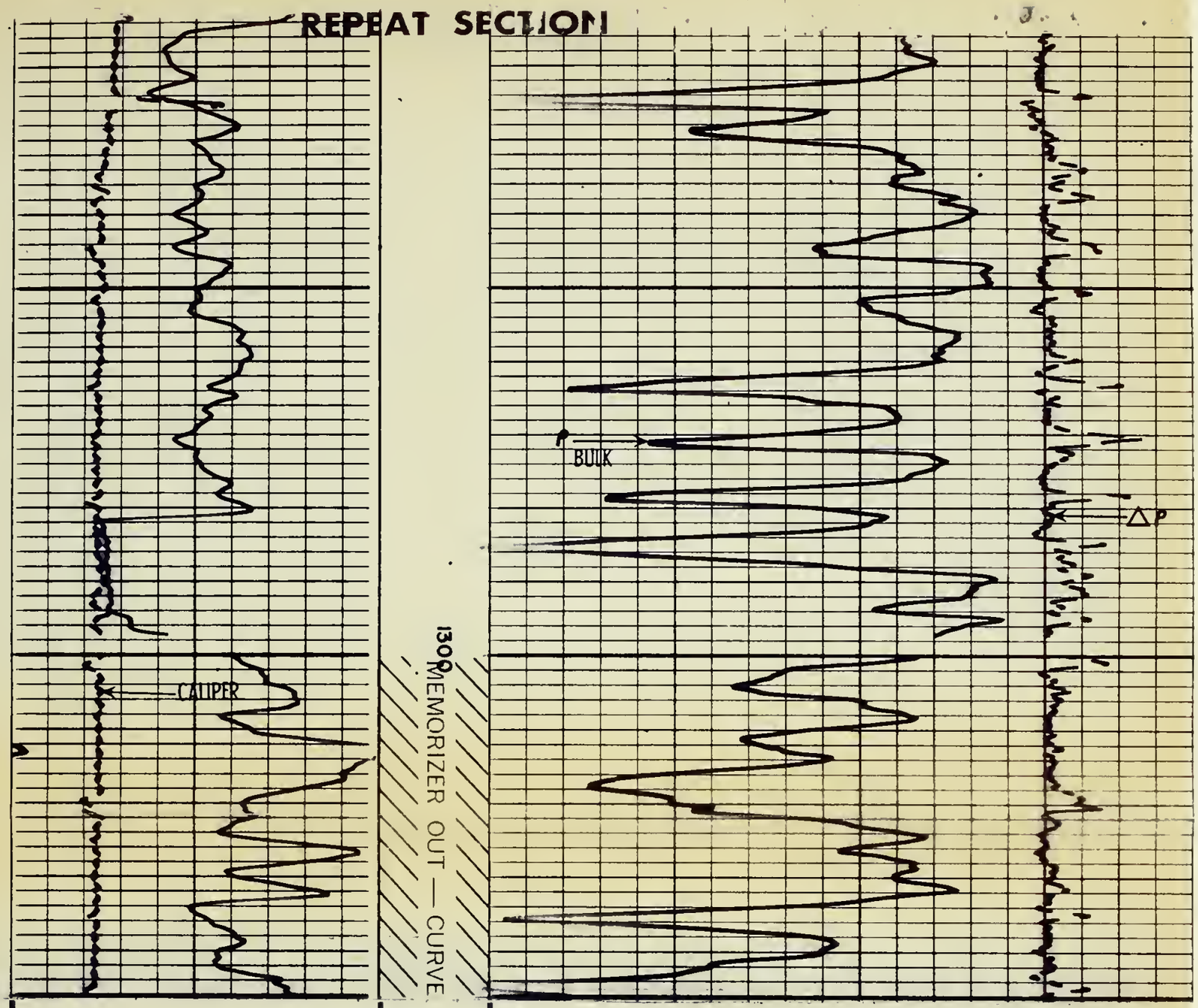
0060
0080


1000
1100



Δρ
ρ BULK
200
1300
1400
-TD- -FR-
GR
CALIPER
-FR-GR

REPEAT SECTION




130 MEMORIZER OUT — CURVE

0 150

150 300

**GAMMA RAY**
API UNITS

4 14

**CALIPER**
HOLE DIAM. IN INCHES

DEPTHS

1.7 2.2 2

.7 1.2 1

**BULK DENSITY**
GRAMS/CC.

—.25 0 +

**CORRECTION**
GRAMS CC.

COMPANY ATLANTIC RICHFIELD COMPANY

WELL SORGHUM [illegible] 1R

FIELD SORGHUM [illegible]

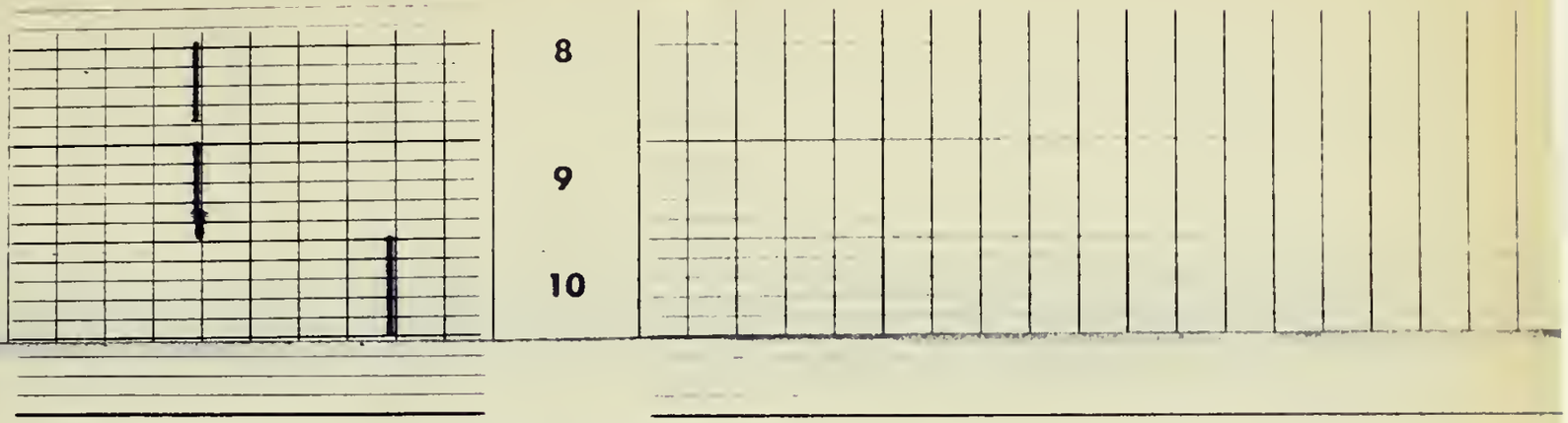
COUNTY RIO BLANCO STATE COLORADO

SCHL. FR 1422
SCHL. TD 1423
DRLR TD 1430

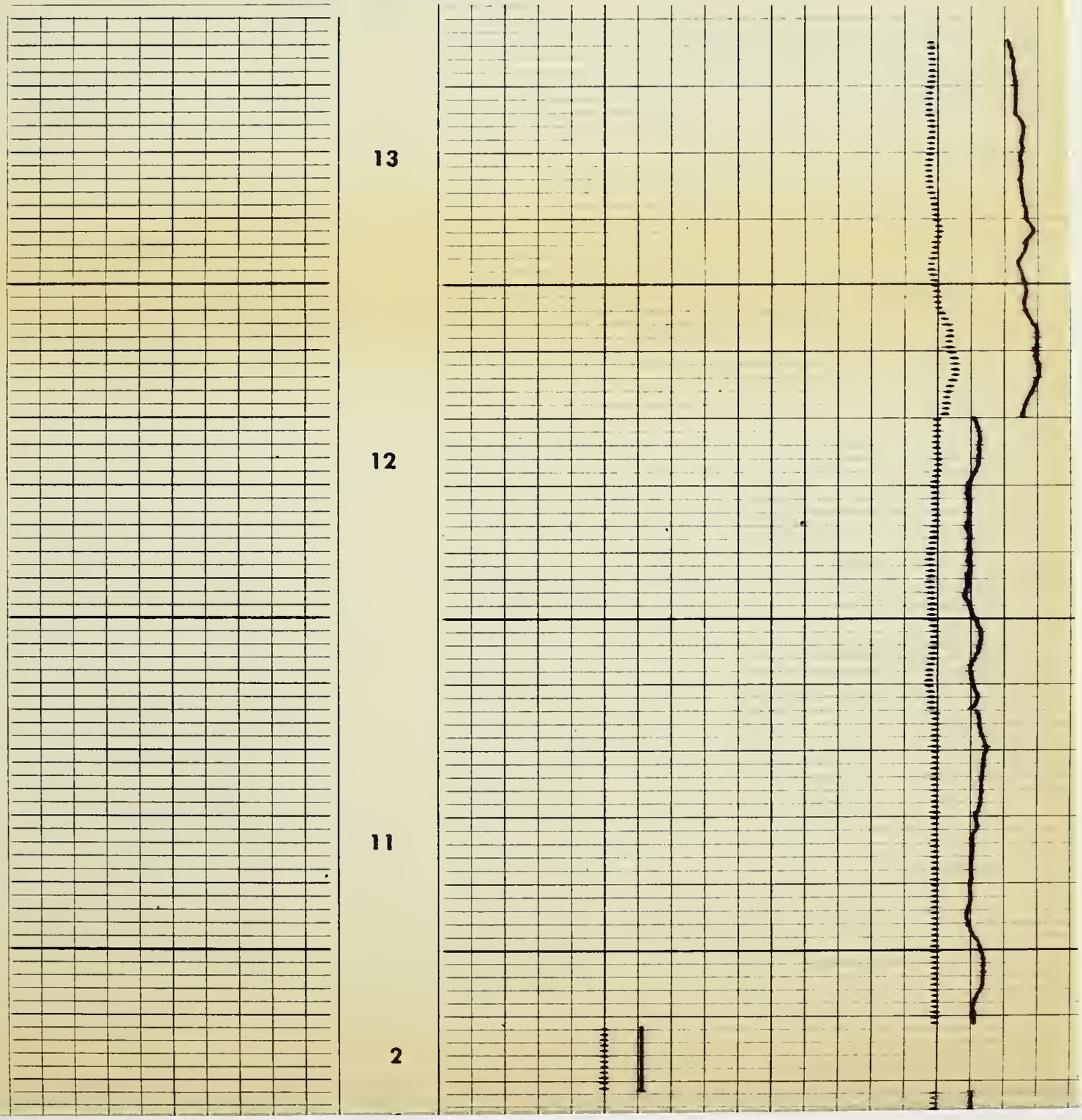
COUNTY [illegible]

# CALIBRATION RECORD

## CALIPER CALIBRATION

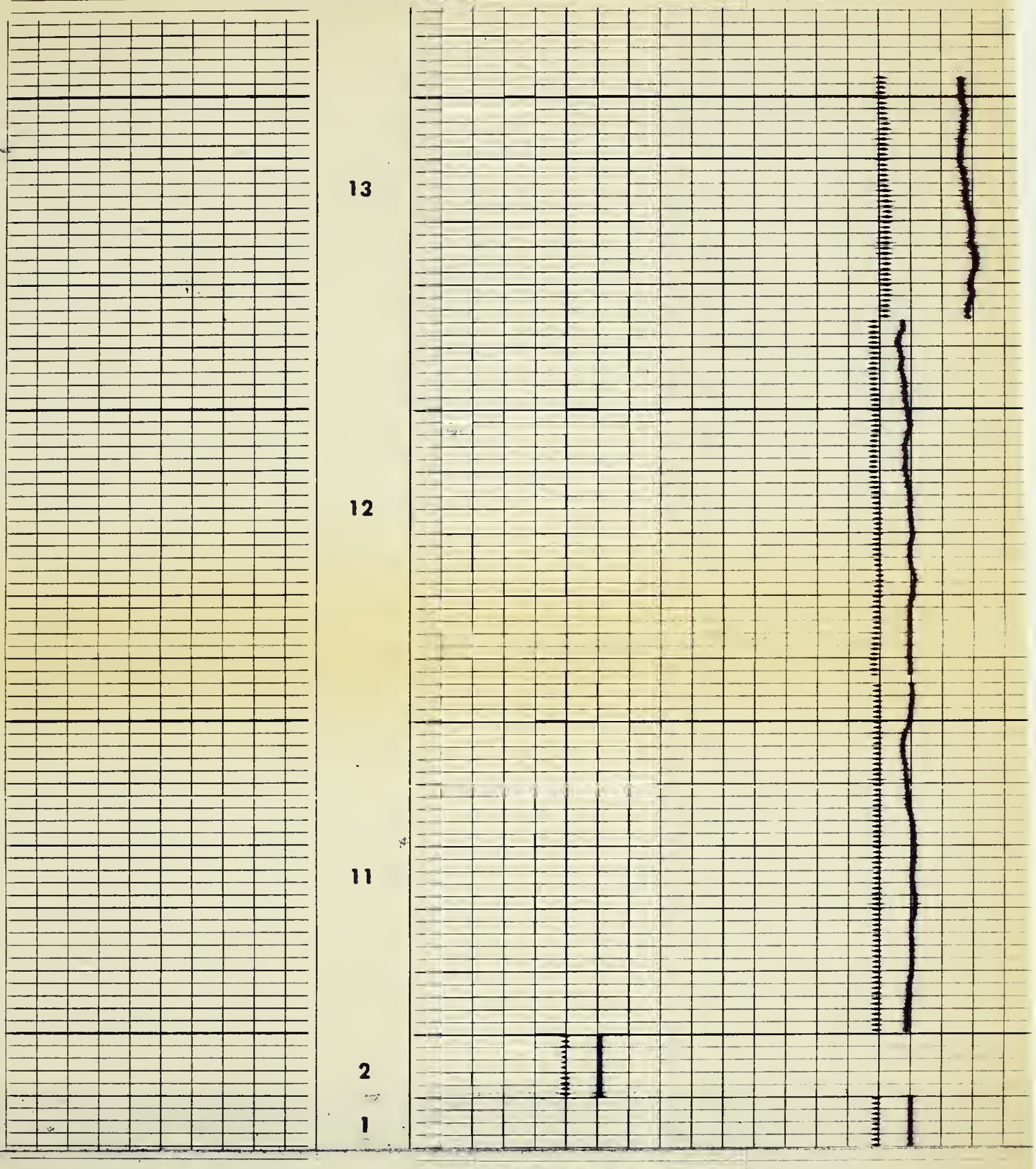



## AFTER SURVEY CALIBRATION

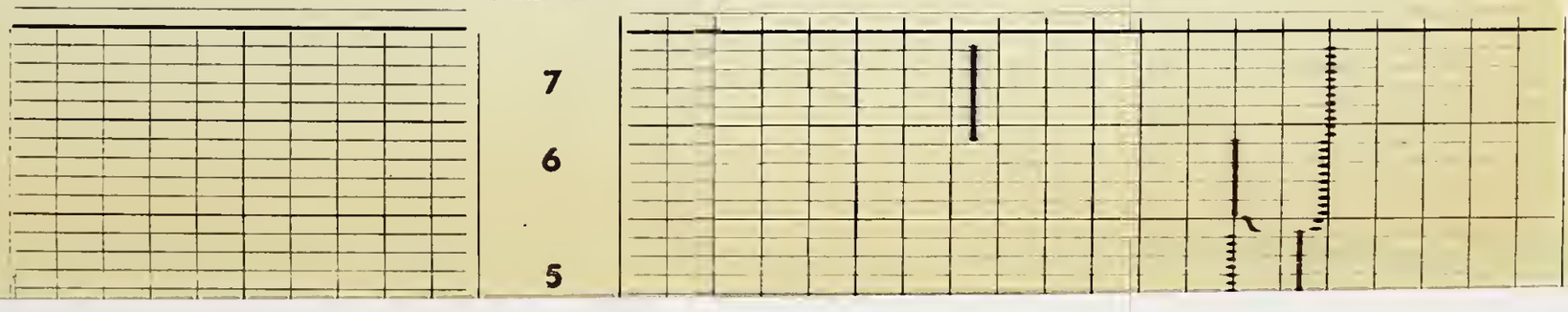


1

BEFORE SURVEY CALIBRATION




PANEL TEST



5

4

3

2

1

13

12

11

## FORMATION DENSITY COMPENSATED CALIBRATION CODING

1. MECHANICAL ZERO
2. RECORDER SENSITIVITY

PANEL TEST

FDC LIQUID

| | POS | $\rho$ | $\Delta\rho$ |
|---|---|---|---|
| 3. | # 1 | 2.92 | .00 |
| 4. | # 2 | 2.78 | +.14 |
| 6. | # 3 | 2.42 | −.10 |
| 6. | # 4 | 2.35 | .00 |
| 7. | # 5 | 2.08 | .01 |

8. MECHANICAL ZERO CALIPER
9. 8" RING
10. 12" RING
11. TOOL CALIBRATE #1 SET $\rho = 2.50$
12. TOOL CALIBRATE #2 SET $\Delta\rho = .00$
13. LOG POSITION $\rho = 2.59$, $\Delta\rho = .015$

# CALIBRATION RECORD

COMPANY ATLANTIC RICHFIELD COMPANY

WELL SORGHUM GULCH #18

FIELD SORGHUM GULCH

COUNTY RIO BLANCO STATE COLORADO

SCHL. FR 1422
SCHL. TD 1423
DRLR TD 1430
Elev:
KB ----
DF ----
GL 7383

Schlumberger

# TEMPERATURE LOG

COUNTY RIO BLANCO
FIELD or LOCATION SORGHUM GULCH
WELL SORGHUM GULCH #18
COMPANY ATLANTIC RICHFIELD

COMPANY ATLANTIC RICHFIELD COMPANY

WELL SORGHUM GULCH #18

FIELD SORGHUM GULCH

COUNTY RIO BLANCO STATE COLORADO

LOCATION
1240' FSL & 366' FEL
Sec. 25 Twp. 3S Rge. 97W

Other Services:
BHC-GR
LL-7
FDC-GR

Permanent Datum: GL ; Elev.: 7383
Log Measured From GL , Ft. Above Perm. Datum
Drilling Measured From GL

Elev.: K.B. ----
D.F. ----
G.L. 7383

| | | | | |
|---|---|---|---|---|
| Date | | 10-4-74 | | |
| Run No. | | ONE | | |
| Depth—Driller | | 1430 | | |
| Depth—Logger | | 1426 | | |
| Btm. Log Interval | | 1422 | | |
| Top Log Interval | | 50 | | |
| Casing—Driller | | 7 @ 60 | @ | @ |
| Casing—Logger | | - | | |
| Casing Size | 1 | 7 To 60 | To | To |
| | 2 | - To | To | To |
| Casing Weight | 1 | - | | |
| | 2 | - | | |
| Casing Thickness | 1 | - | | |
| | 2 | - | | |
| Bit Size | 1 | 6 1/4 To 1430 | To | To |
| | 2 | - To - | To | To |
| Type Fluid in Hole | | WATER | | |
| Dens. \| Visc. | | | | |
| Time Since Circ. | | | | |
| BHT | | 81.5° F | | |
| Equip. \| Location | | 7674 VERNAL | | |
| Recorded By | | HAUGAARD | | |
| Witnessed By | | TAIT | | |

FOLD HERE

The well name, location and borehole reference data were furnished by the customer.

REMARKS:

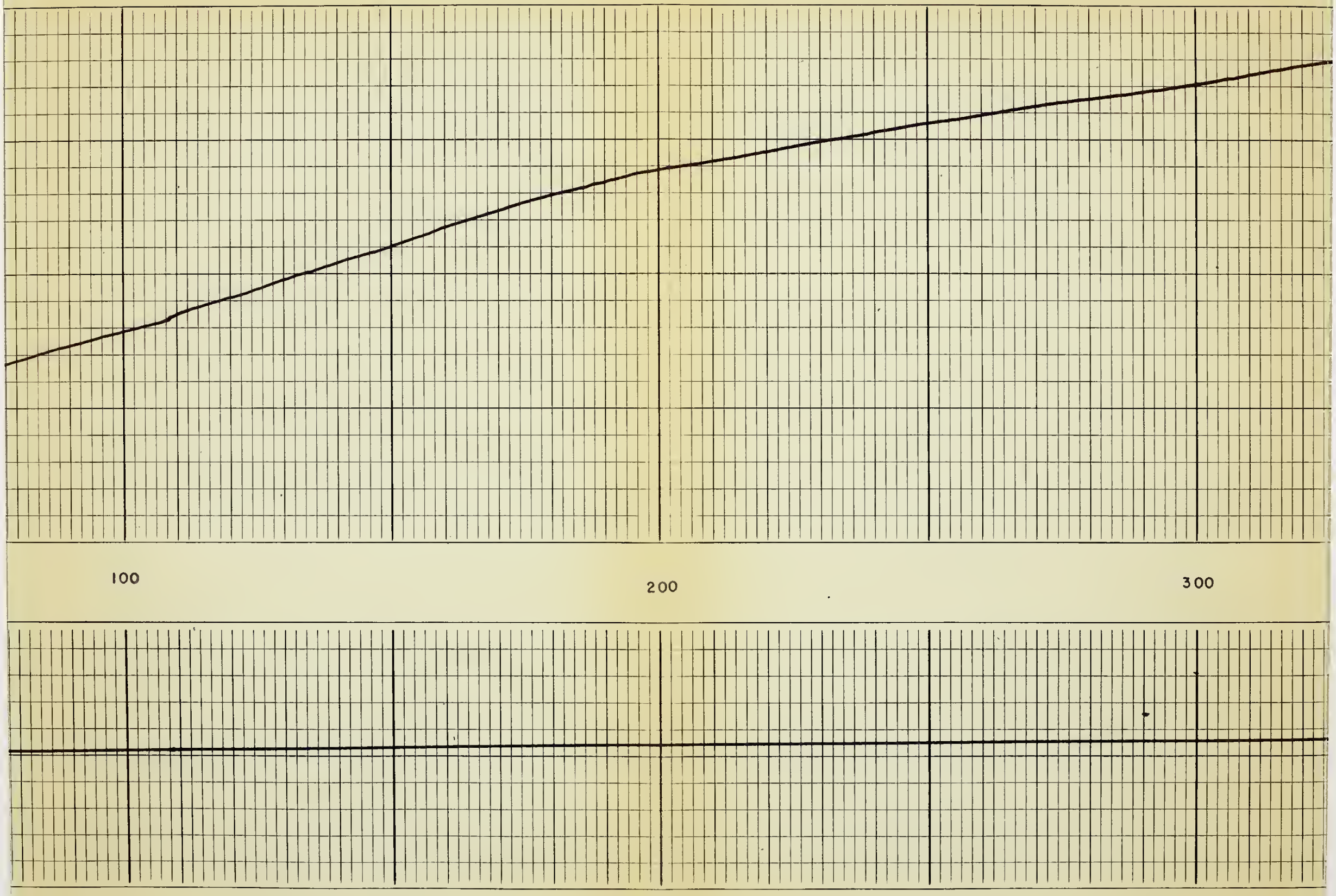
CEMENTATION DATA

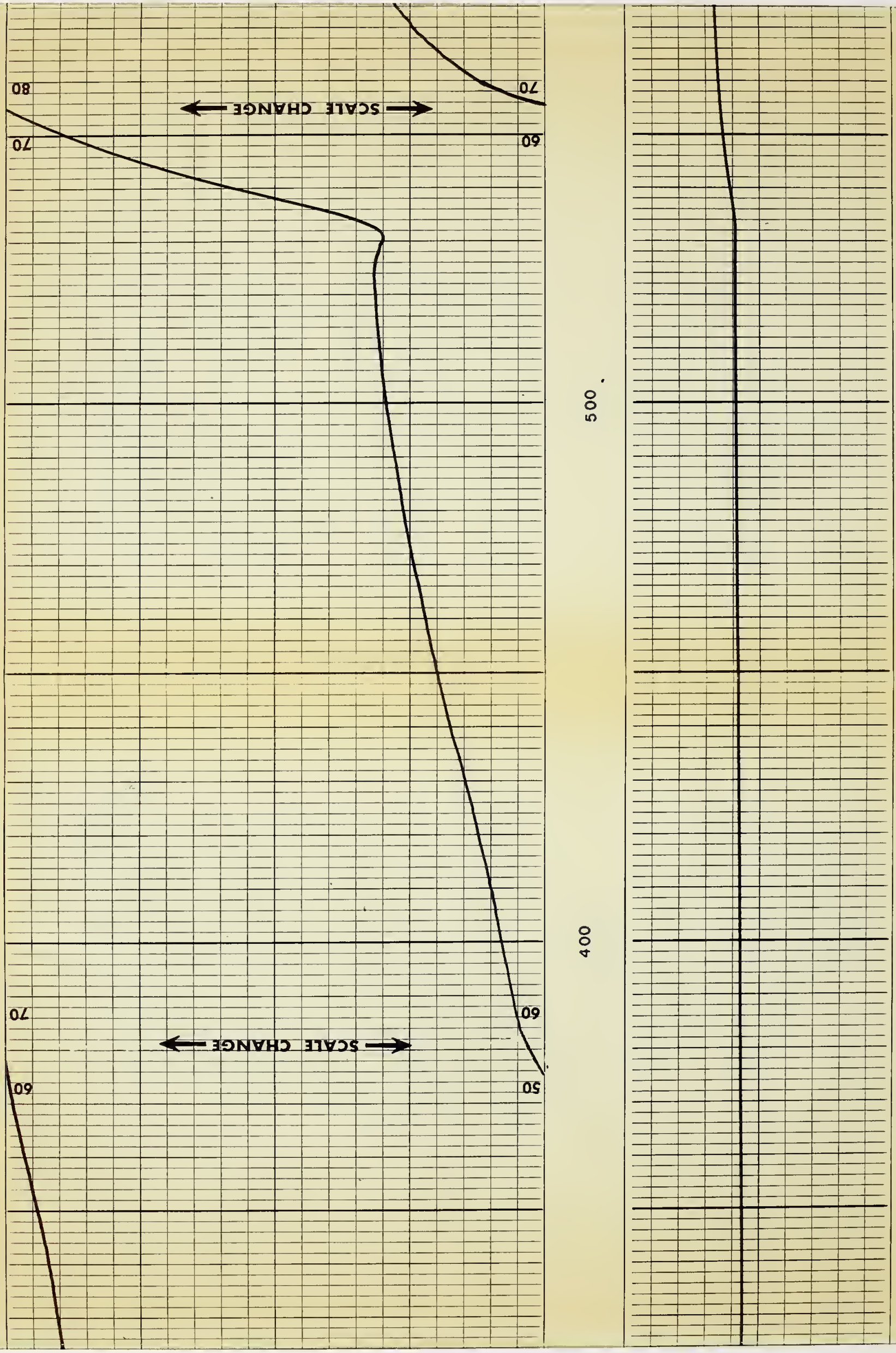
| Depth | Type of Cement | No. of Sacks | Additives | Calculated Top |
|---|---|---|---|---|
| | | | | |

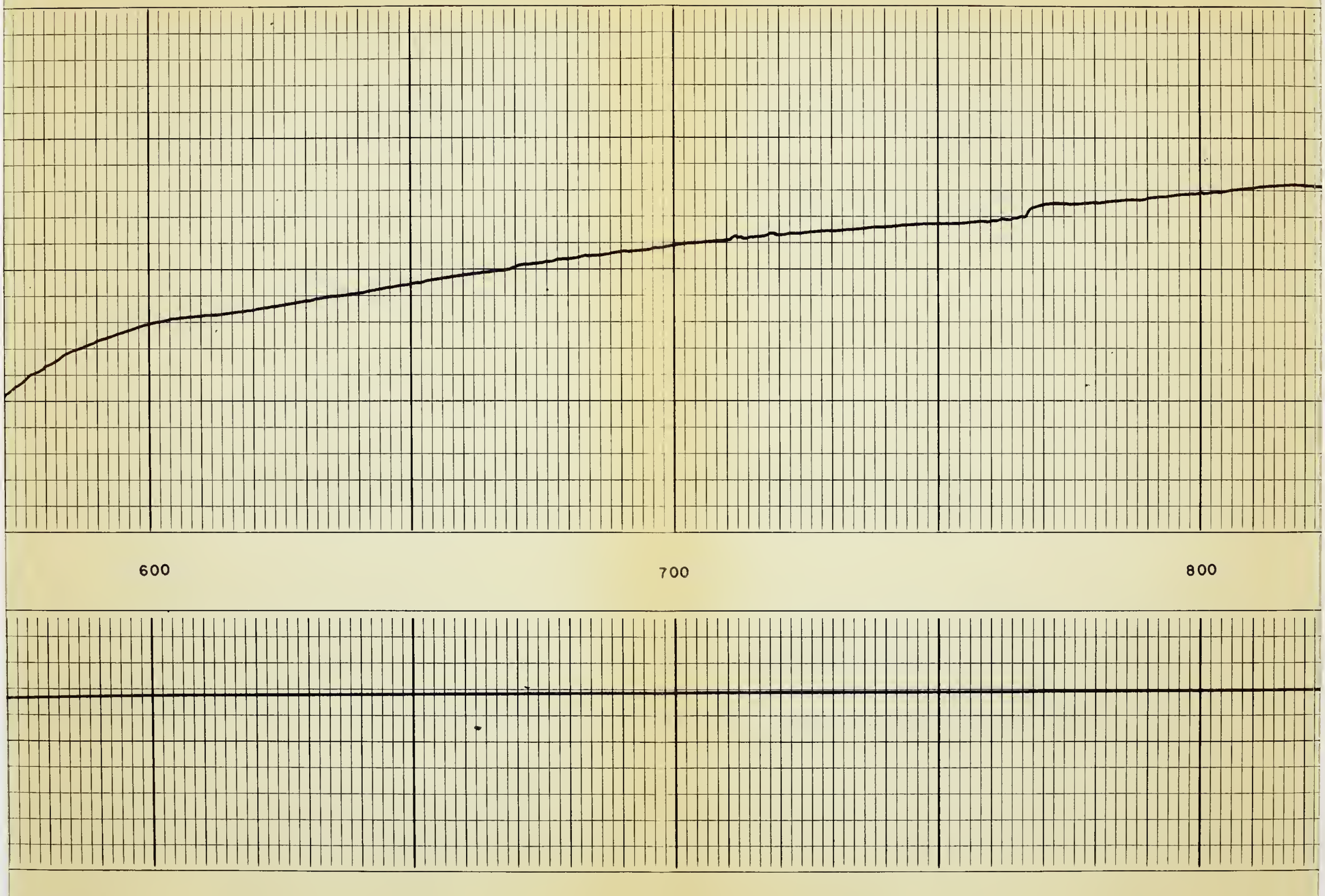
TEMPERATURE °F.

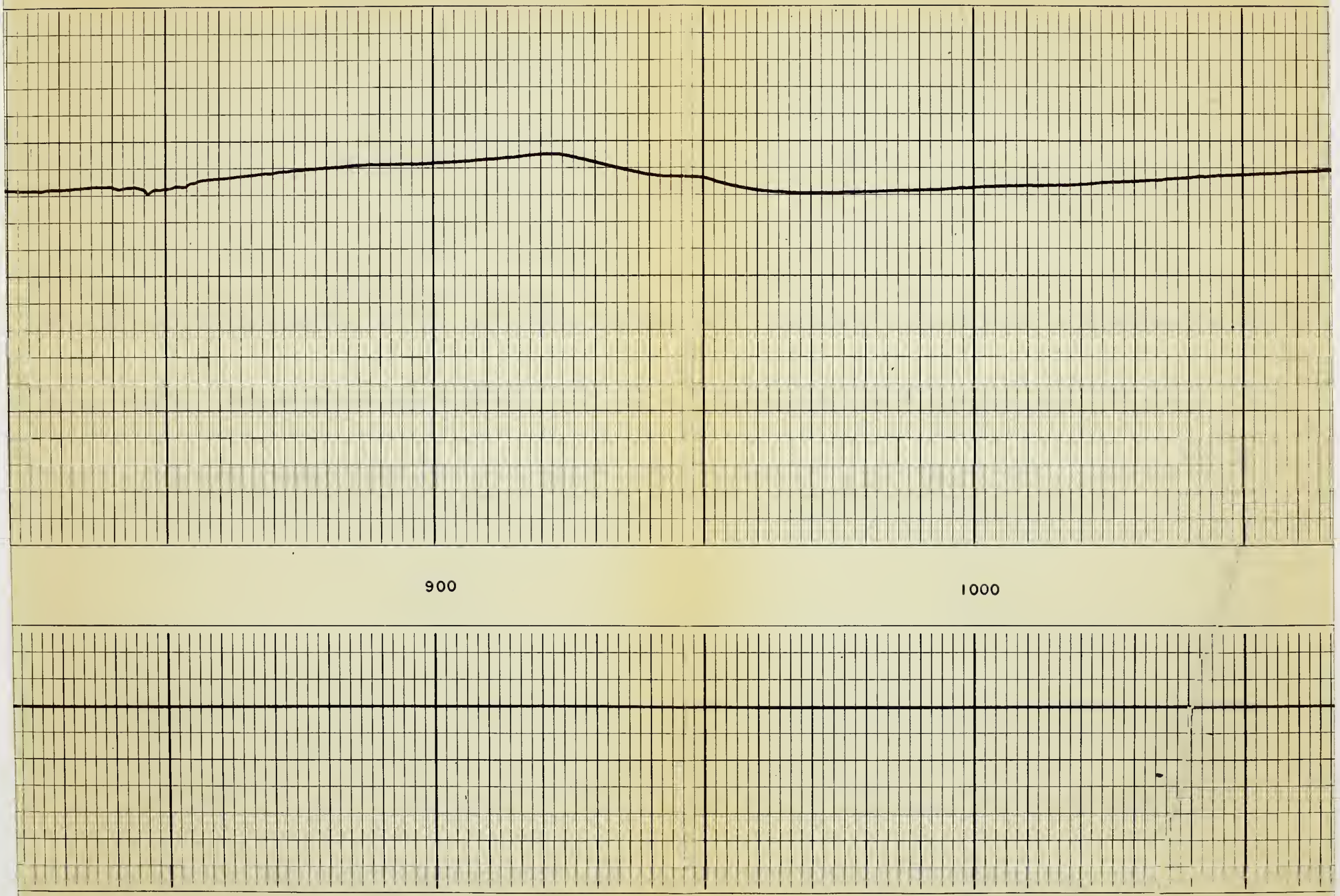
REDUCED SENSITIVITY TEMPERATURE

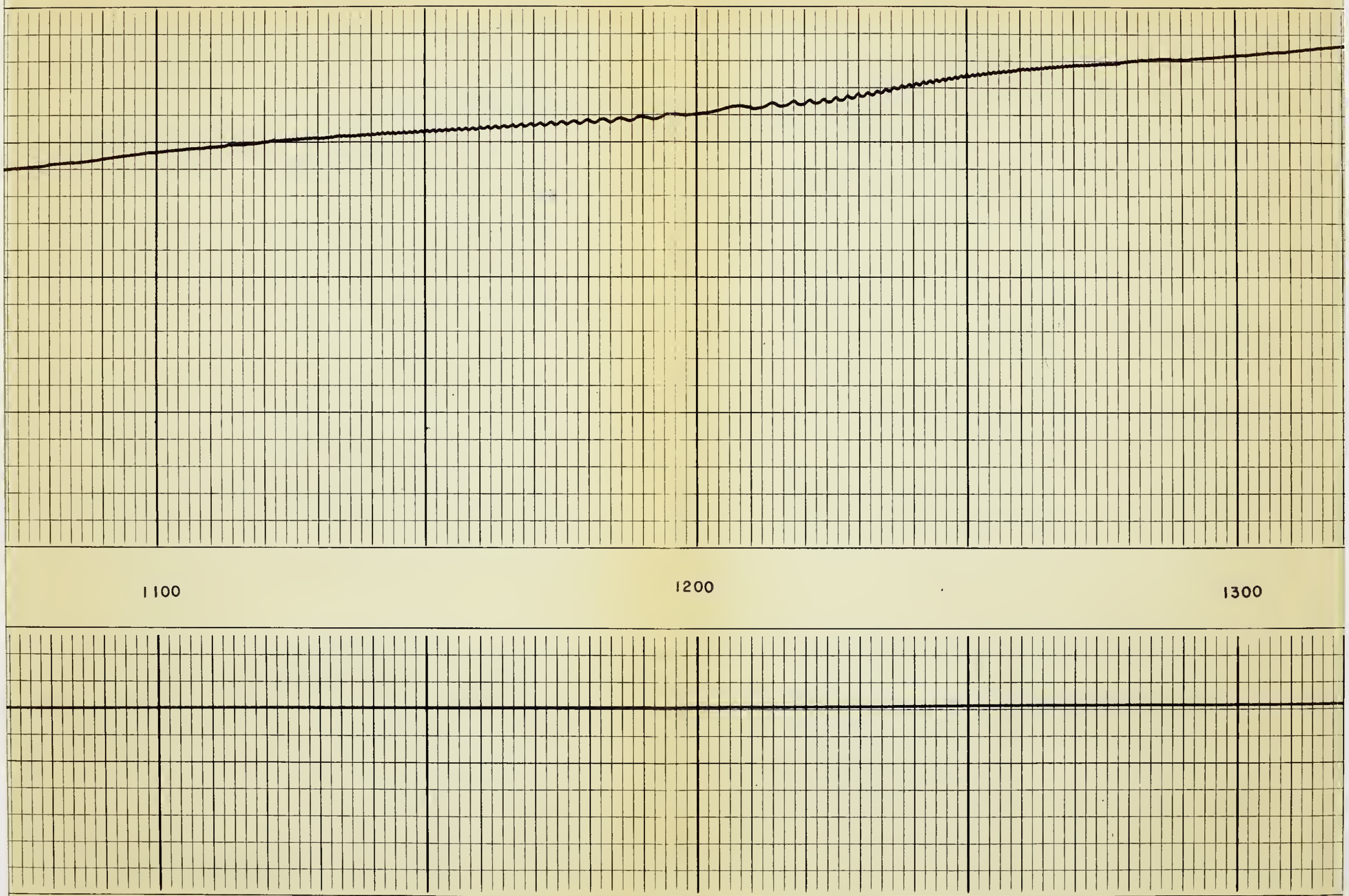
60
50

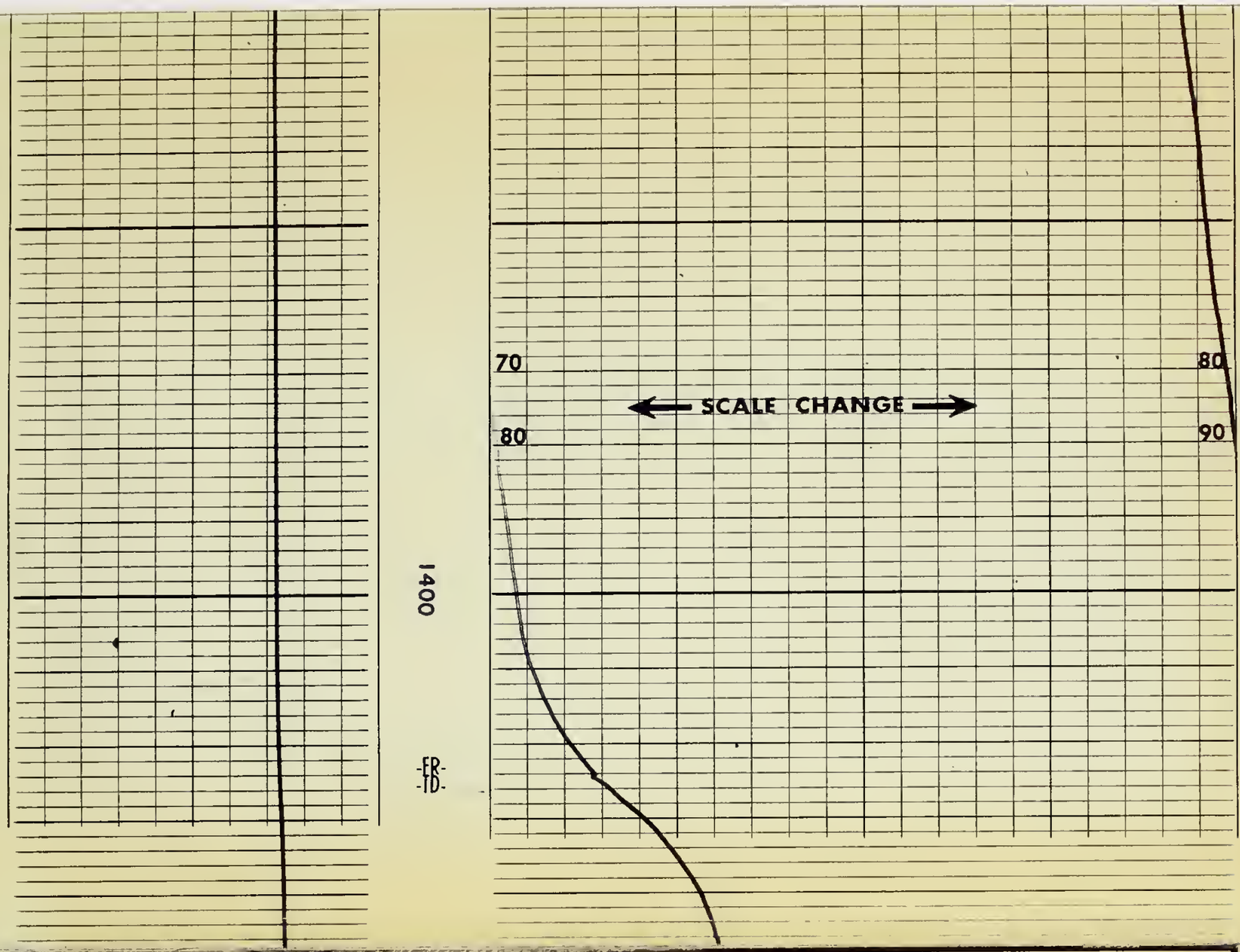

100
200
300


80
70
SCALE CHANGE
70
60
500
70
60
SCALE CHANGE
60
50
400


600
700
800


900
1000


1100
1200
1300




TEMPERATURE °F.

COMPANY ATLANTIC RICHFIELD COMPANY

WELL SORGHUM GULCH #18

FIELD SORGHUM GULCH

COUNTY RIO BLANCO STATE COLORADO

SCHL. F. R. 1422
SCHL. T. D. 1426
DRLR. T. D. 1430

COREHOLE SG-19

THIS ENVELOPE CONTAINS THE FOLLOWING GEOPHYSICAL LOGS:

Schlumberger: Borehole Compensated Sonic
Laterolog
Formation Density
Temperature

II B-369

Schlumberger

# BOREHOLE COMPENSATED SONIC LOG

COUNTY RIO BLANCO
FIELD or LOCATION SORGHUM GULCH
WELL SORGHUM GULCH 19
COMPANY ATLANTIC RICHFIELD

COMPANY ATLANTIC RICHFIELD COMPAN.

WELL SORGHUM GULCH 19

FIELD SORGHUM GULCH

COUNTY RIO BLANCO STATE COLORADO

LOCATION: API Serial No.

NW NW NW

Sec. 5 Twp. 3S Rge. 96W

Other Services:
LL7
FDC GR
TEMP

Permonent Datum: G.L. ; Elev.: 6370
Log Measured From G.L., 0 Ft. Above Perm. Datum
Drilling Measured From G.L.

Elev.: K.B.
D.F.
G.L. 6370

| | | | | |
|---|---|---|---|---|
| Date | 9/24/74 | | | |
| Run No. | ONE | | | |
| Depth—Driller | 920 | | | |
| Depth—Logger | 936 | | | |
| Btm. Log Intervol | 923 | | | |
| Top Log Interval | 350 | | | |
| Cosing—Driller | 7" @ 150 | @ | @ | @ |
| Cosing—Logger | | | | |
| Bit Size | 6 1/4 | | | |
| Type Fluid in Hole | WATER | | | |
| Dens. / Visc. | / | / | / | / |
| pH / Fluid Loss | / ml | / ml | / ml | / ml |
| Source of Sample | | | | |
| $R_m$ @ Meas. Temp. | @ °F | @ °F | @ °F | @ °F |
| $R_{mf}$ @ Meas. Temp. | @ °F | @ °F | @ °F | @ °F |
| $R_{mc}$ @ Meas. Temp. | @ °F | @ °F | @ °F | @ °F |
| Source: $R_{mf}$ / $R_{mc}$ | / | / | / | / |
| $R_m$ @ BHT | @ °F | @ °F | @ °F | @ |
| TIME Circulation Stopped | | | | |
| | | | | |
| Max. Rec. Temp. | 81.5 °F | °F | °F | °F |
| Equip. / Location | 7033 / VERN | / | / | / |
| Recorded By | HAUGAARD | | | |
| Witnessed By | LLARD, TAIT | | | |

SWS-1384-G

FOLD HERE

The well name, location and borehole reference data were furnished by the customer.

## SCALE CHANGES

| Type Log | Depth | Scale Up Hole | Scale Down Hole |
|---|---|---|---|
| | | | |

## LOGGING DATA

| Porosity Selectors | | | Depth | |
|---|---|---|---|---|
| $\Delta t_m$ | $\Delta t_f$ | Cp | ϕ Scale | From | To |
| | | | | | |

## REMARKS

WELL WAS FLOWING WHILE LOGGING.
TURBULENCE PREVENTED A GOOD SONIC
ABOVE 400'. CUSTOMER DID NOT
WANT TO TAKE TIME TO MUD UP.

Velocity (ft/sec) = 1,000,000 / Interval Transit Time (microseconds per foot)

All interpretations are opinions based on inferences from electrical or other measurements and we cannot, and do not guarantee the accuracy or correctness of any interpretations, and we shall not, except in the case of gross or willful negligence on our part, be liable or responsible for any loss, costs, damages or expenses incurred or sustained by anyone resulting from any interpretation made by any of our officers, agents or employees. These interpretations are also subject to Clause 7 of our General Terms and Conditions as set out in our current Price Schedule.

## EQUIPMENT DATA

| | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Run No. | ONE | | | | | | | | | | | | | | | | | | | | | | |
| Service Order No. | 7033 | | | | | | | | | | | | | | | | | | | | | | |
| Fluid Level | FULL | | | | | | | | | | | | | | | | | | | | | | |
| Sonic Panel No. | SG 110 | | | | | | | | | | | | | | | | | | | | | | |
| Sonic Cart No. | DG-136 | | | | | | | | | | | | | | | | | | | | | | |
| Sonic Sonde No. | RB-163 | | | | | | | | | | | | | | | | | | | | | | |
| Mem. Panel No. | ILrA 166 | | | | | | | | | | | | | | | | | | | | | | |
| G.R. Cart. No. | J 204 | | | | | | | | | | | | | | | | | | | | | | |
| G.R. Panel No. | ILrA-166 | | | | | | | | | | | | | | | | | | | | | | |
| Caliper No. | | | | | | | | | | | | | | | | | | | | | | | |
| TTR No. | | | | | | | | | | | | | | | | | | | | | | | |
| Centralizers: No. | | | | | | | | | | | | | | | | | | | | | | | |
| Type | | | | | | | | | | | | | | | | | | | | | | | |
| Standoffs: No. | 2 | | | | | | | | | | | | | | | | | | | | | | |
| Type | RUBBER | | | | | | | | | | | | | | | | | | | | | | |
| Time Const.-Sec. | 2 | | | | | | | | | | | | | | | | | | | | | | |
| Speed - F.P.M. | 30 | | | | | | | | | | | | | | | | | | | | | | |

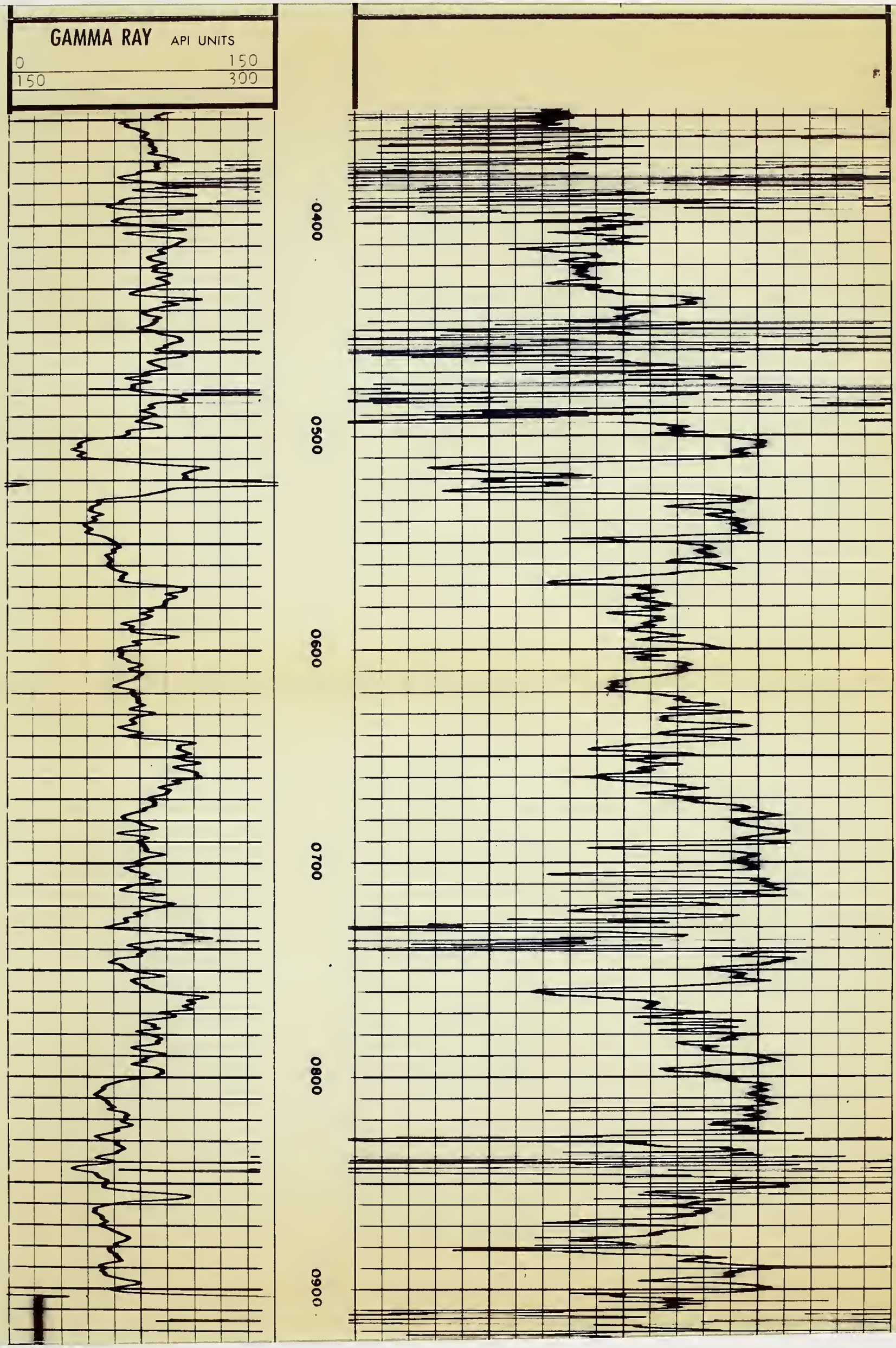
## CALIBRATION DATA

| | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| GR | BKG. CPS | 100 | | | | | | | | | | | | | | | | | | | | | |
| | Source CPS | 400 | | | | | | | | | | | | | | | | | | | | | |
| | Tc Sec | 6 | | | | | | | | | | | | | | | | | | | | | |

## INTERVAL TRANSIT TIME

MICROSECONDS PER FOOT T— $R_1$— $R_2$—

| DEPTH | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 150 | 50 | | | | | | | | | | | | | | | | | | | | | | |
| 250 | 150 | | | | | | | | | | | | | | | | | | | | | | |
| | 200 | | | | | | | | | | | | | | | | | | | | | | |


GAMMA RAY API UNITS
0
150
150
300
0400
0500
0600
0700
0800
0900

# DETAIL LOG

5" = 100'

## GAMMA RAY API UNITS

0 — 150

150 — 300

DEPTH

## INTERVAL TRANSIT TIME MICROSECONDS PER FOOT T____ $R_1$____ $R_2$

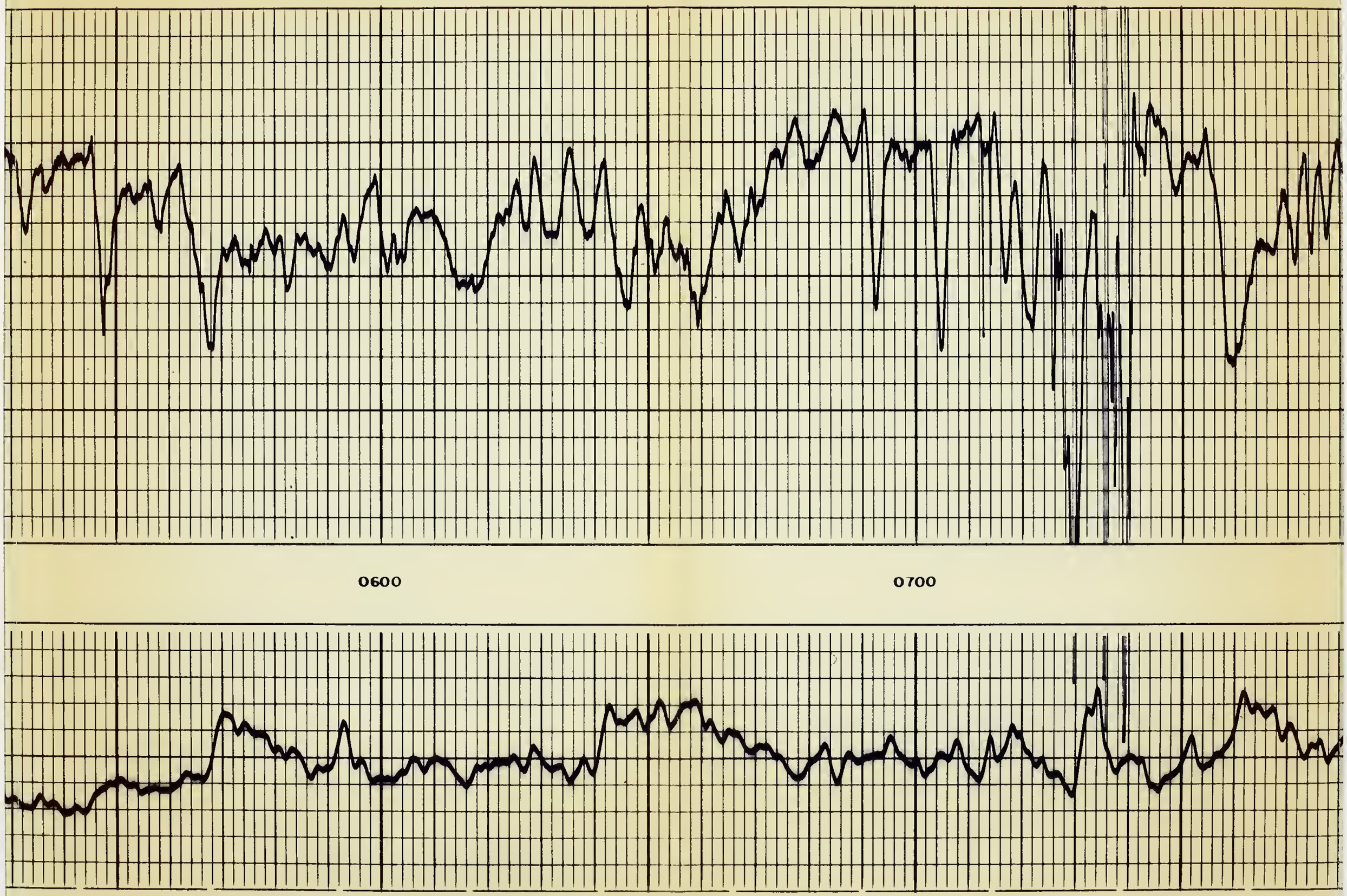
150 — 100 — 50

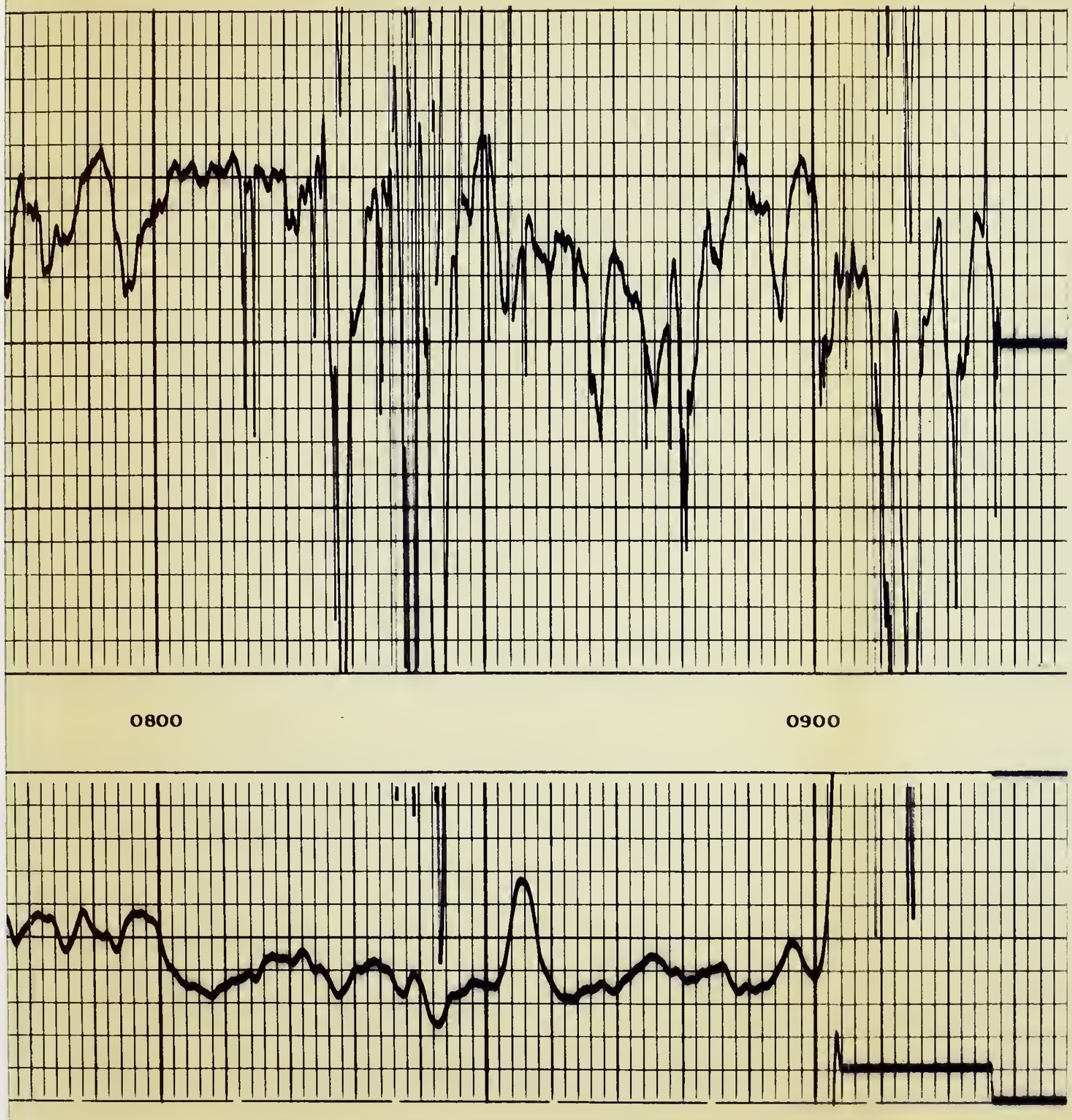
250 — 200 — 150

INTERGRATED TRAVEL TIME

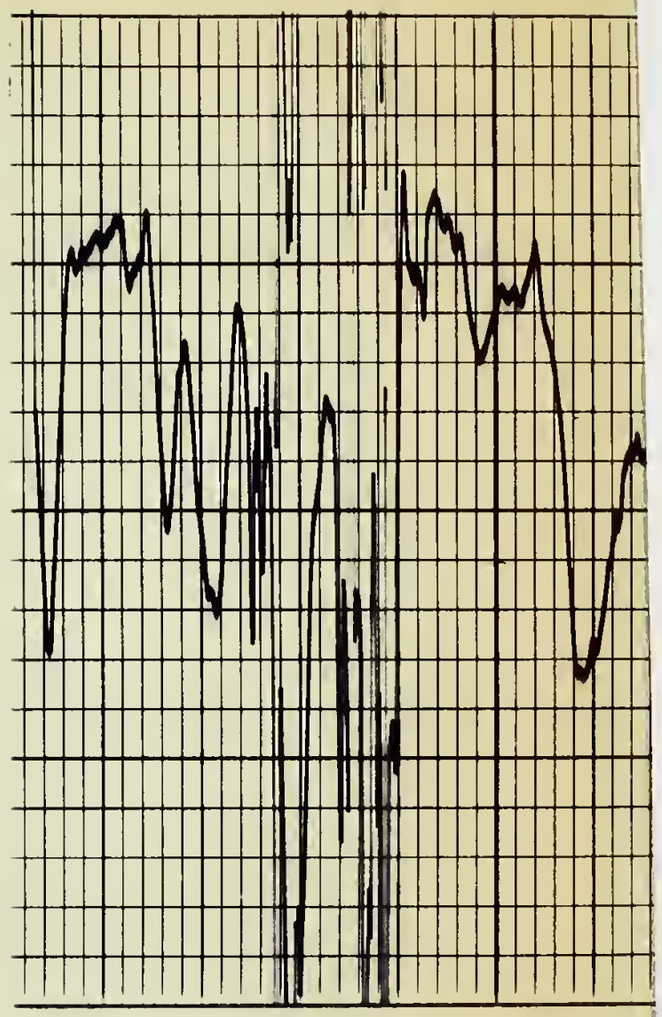
0400

0500


0600
0700

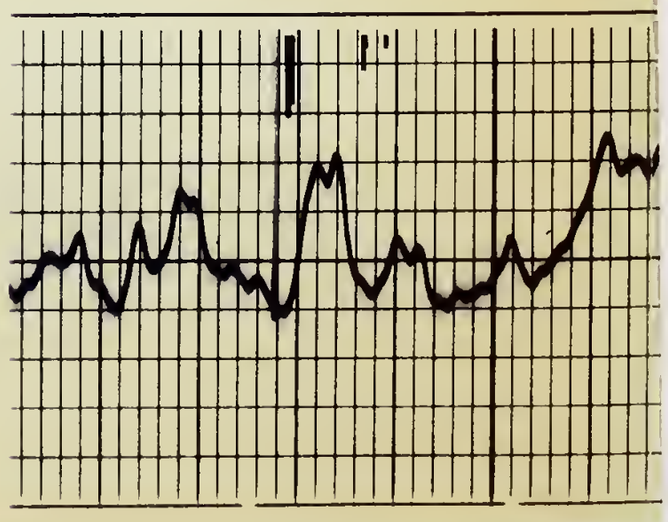


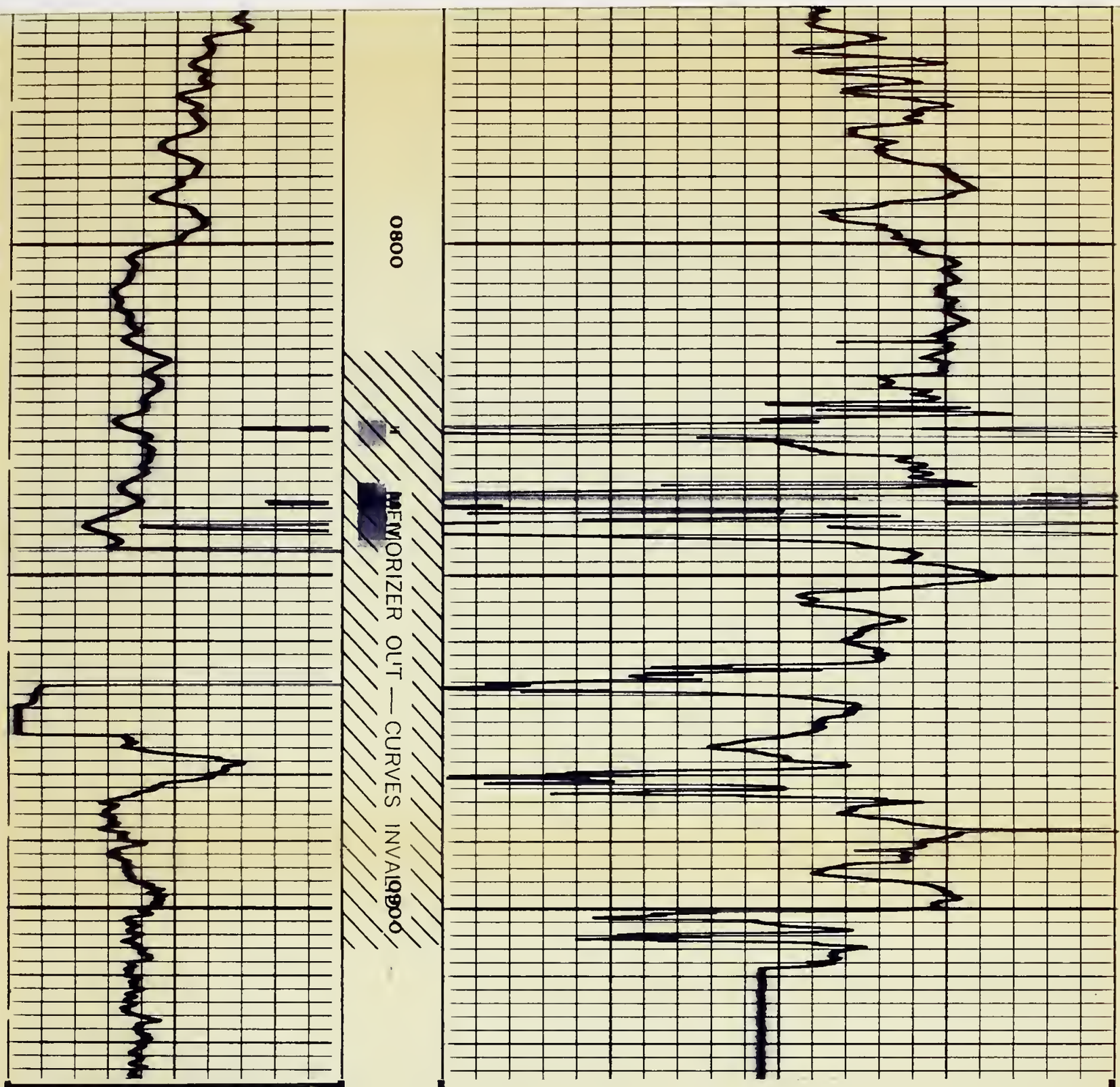
0800



0900








**GAMMA RAY** API UNITS

| | |
|---|---|
| 0 | 150 |
| 150 | 300 |

DEPTH

**INTERVAL TRANSIT TIME** MICROSECONDS PER FOOT T 3 $R_1$ 2 $R_2$

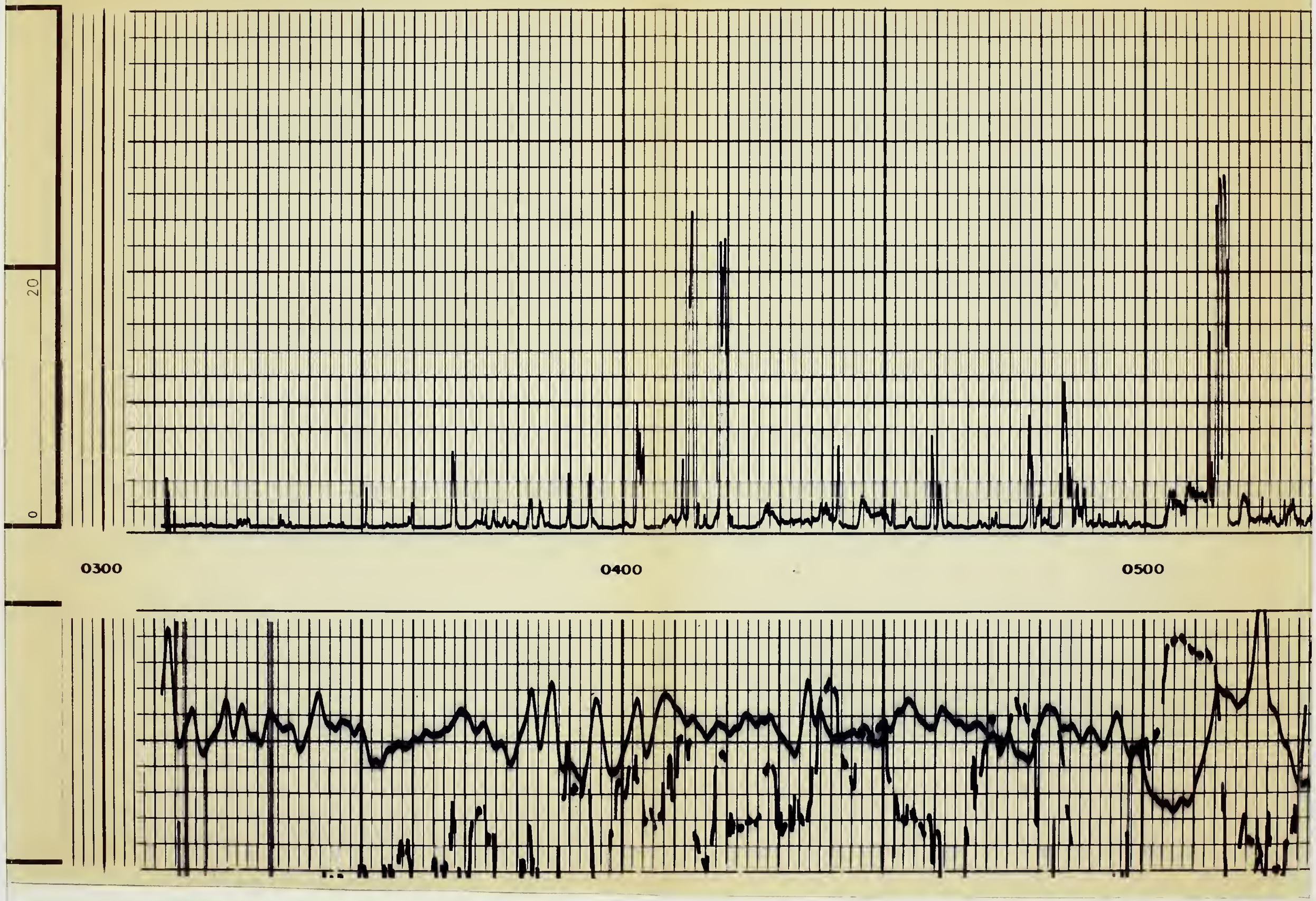
| | | |
|---|---|---|
| 150 | 100 | 50 |
| 250 | 200 | 150 |

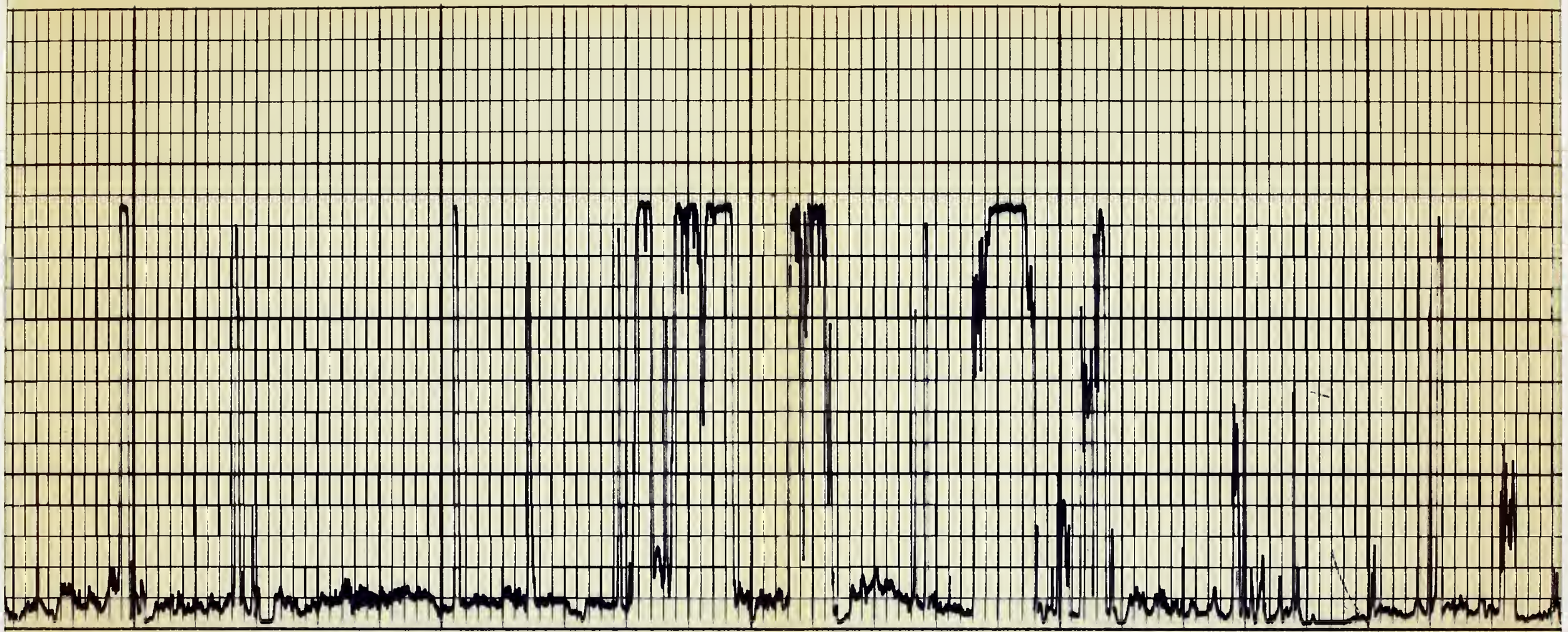
**SINGLE RECEIVER ΔT**
MICROSECONDS

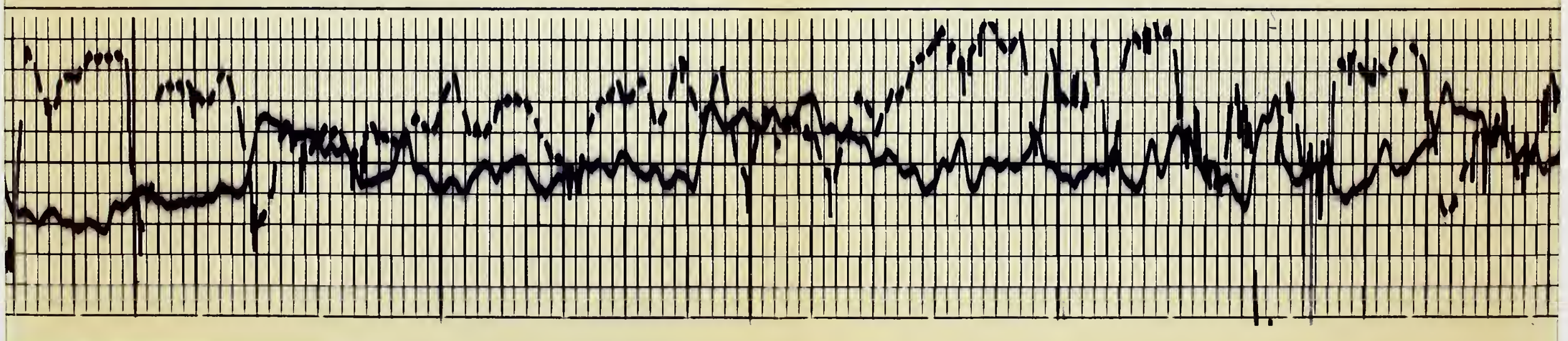
480 280

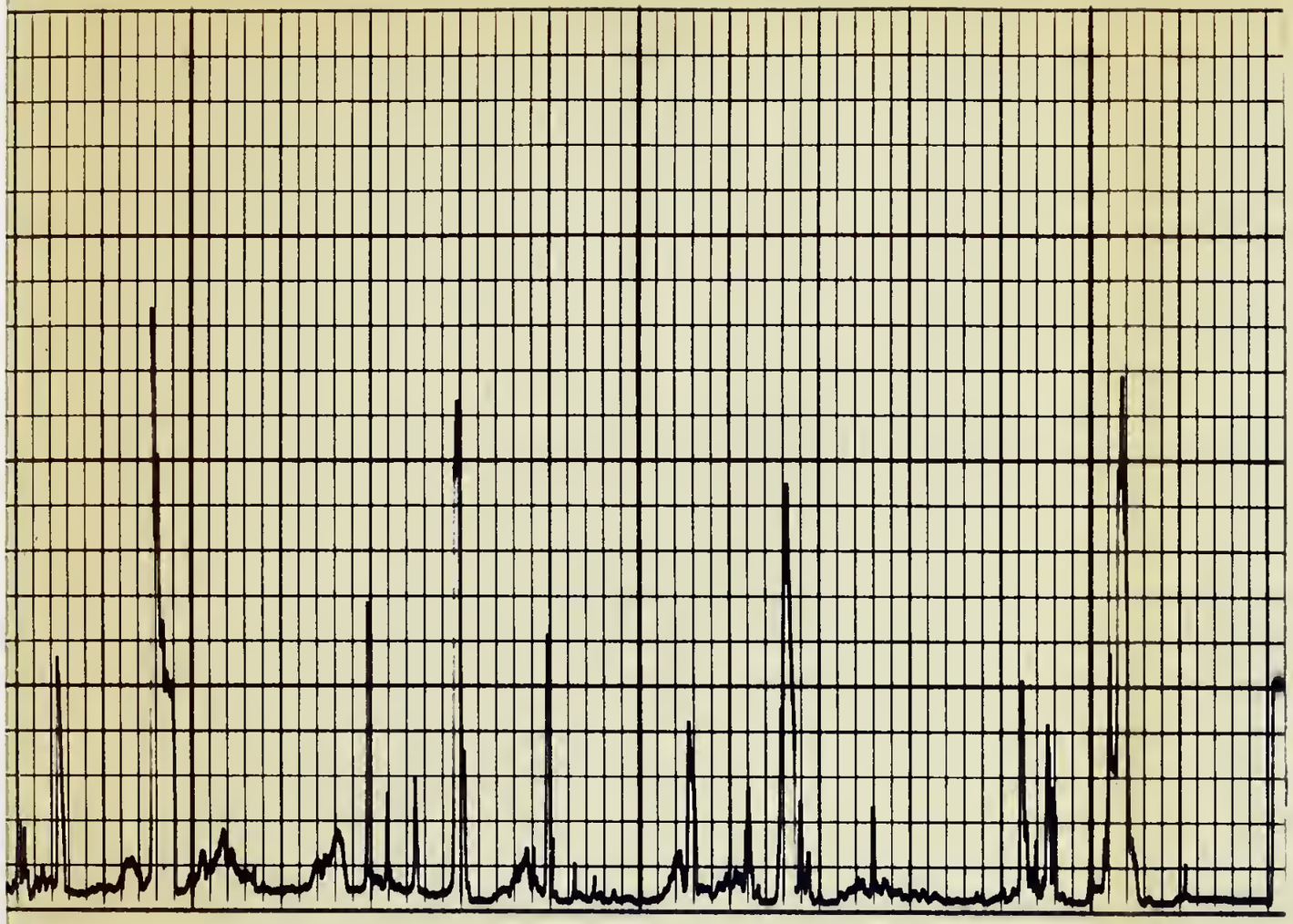
**GAMMA RAY**
API UNITS

| | |
|---|---|
| 0 | 150 |


20
0
0300
0400
0500

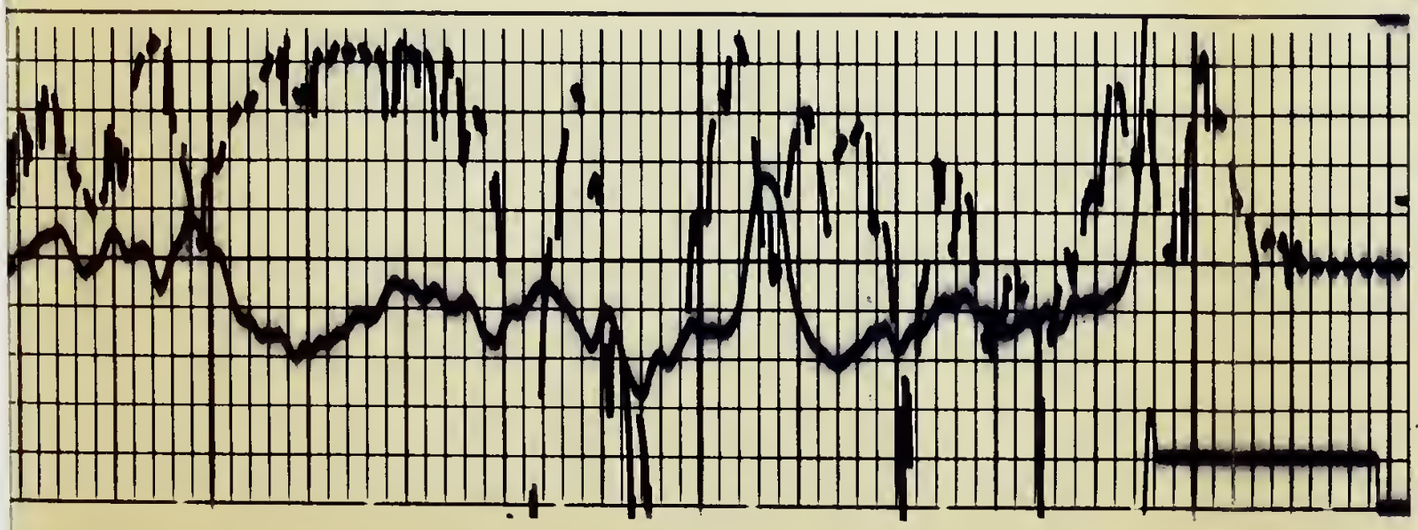

0600
0700

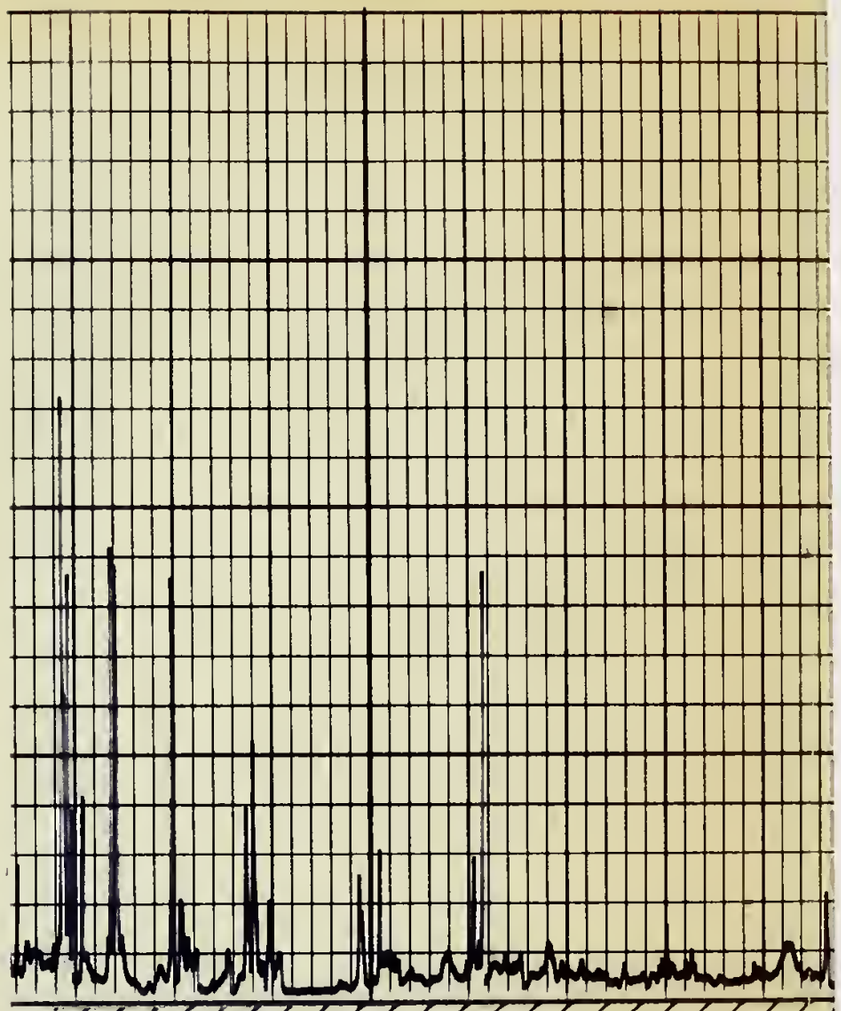




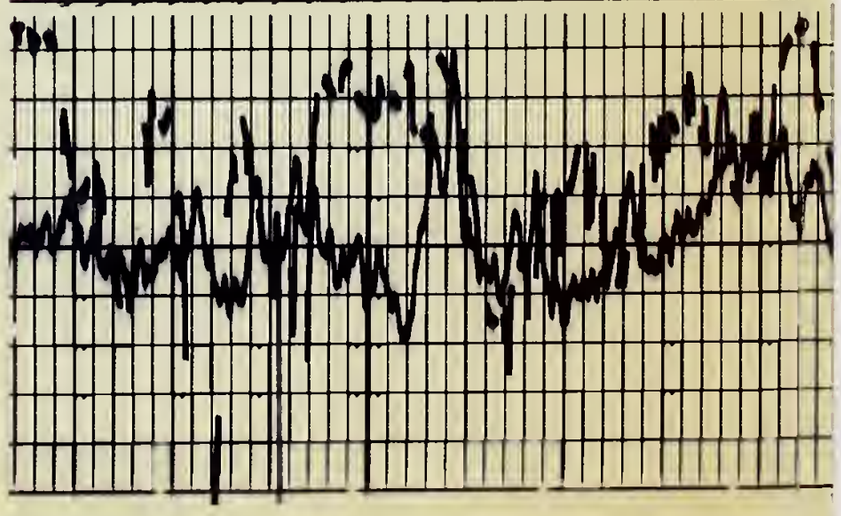
0800

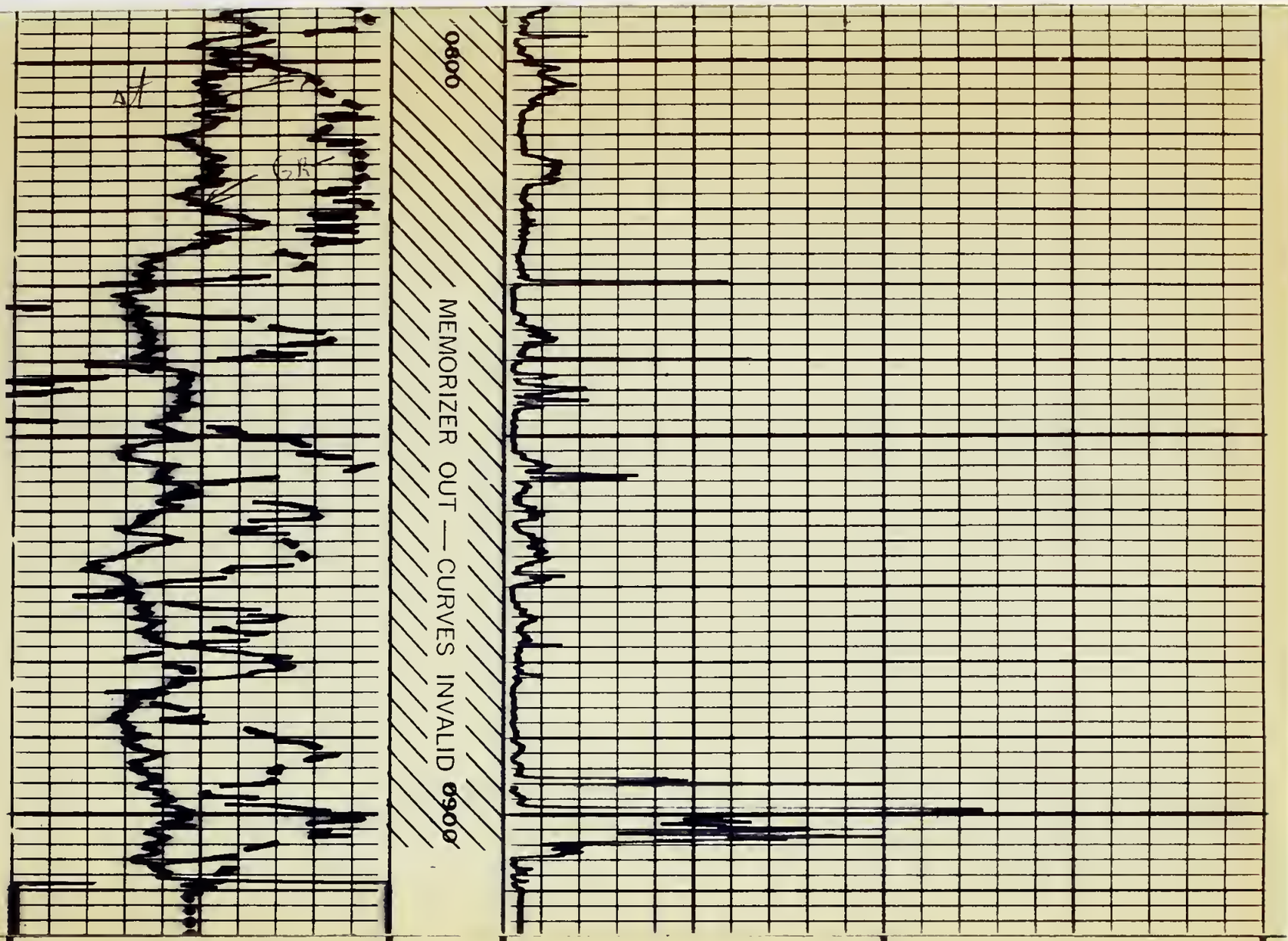
0900





MEMORIZER OUT — CURVES INVALID






**SINGLE RECEIVER ΔT**
MICROSECONDS

480 280

**GAMMA RAY**
API UNITS

0 150

**AMPLITUDE** MILLIVOLTS

0 20

COMPANY ATLANTIC RICHFIELD COMPANY

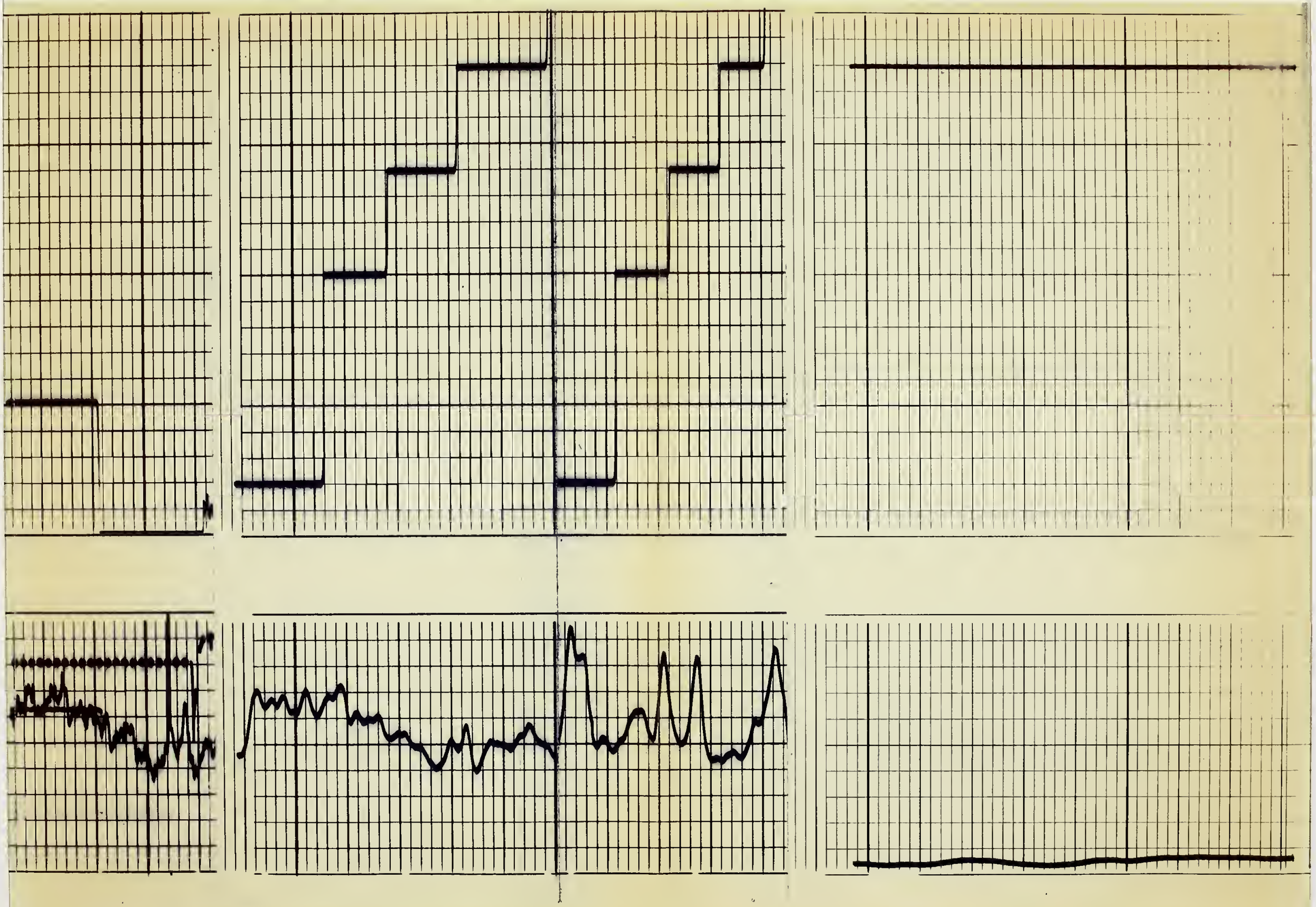
WELL SORGHUM GULCH #19

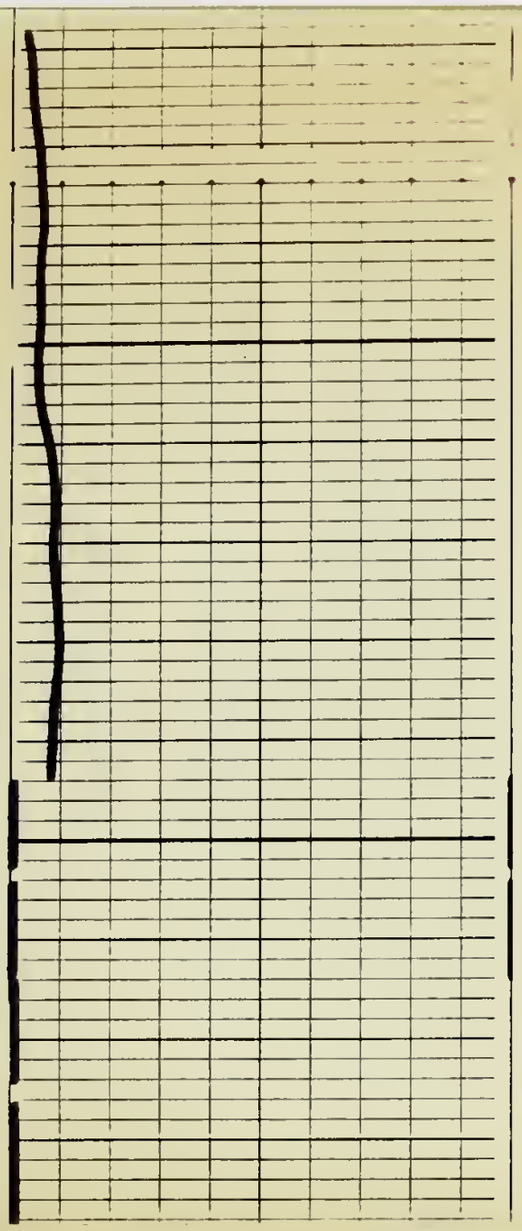
FIELD SORGHUM GULCH

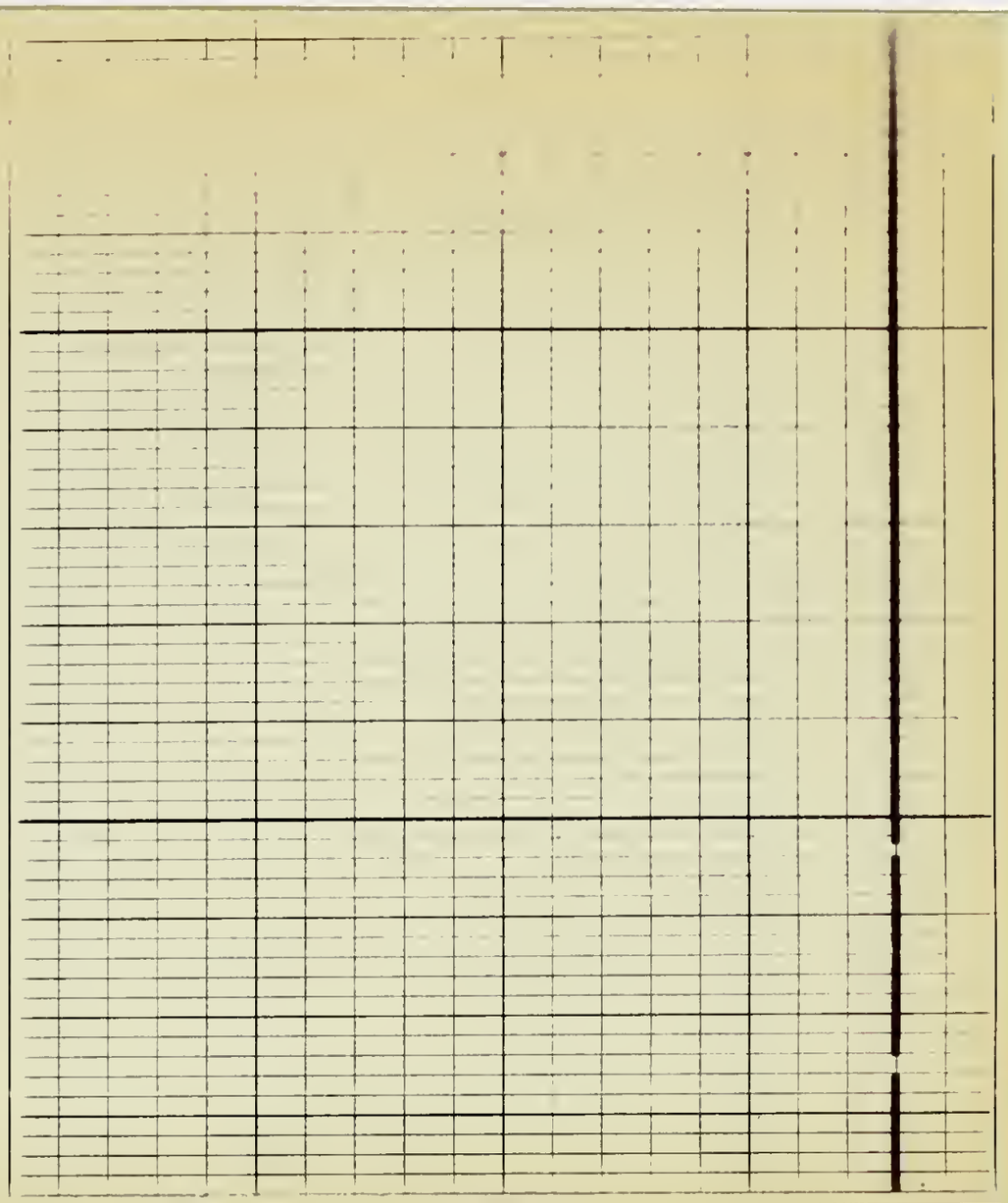
COUNTY RIO BLANCO STATE COLORADO

SCHL. FR 928
SCHL. TD 936
DRLR TD 920
Elev:
KB
DF
GL 6370

CALIBRATION RECORD







# CALIBRATION RECORD

COMPANY ATLANTIC RICHFIELD COMPANY

WELL SORGHUM GULCH #19

FIELD SORGHUM GULCH

COUNTY RIO BLANCO STATE COLORADO

SCHL. FR 928
SCHL. TD 936
DRLR TD 920
Elev:
KB ---
DF ---
GL 6370

SWS-1129-D

Schlumberger

# LATEROLOG

COUNTY RIO BLANCO
FIELD or LOCATION SORGHUM GULCH
WELL SORGHUM GULCH #19
COMPANY ATLANTIC RICHFIELD

COMPANY ATLANTIC RICHFIELD COMPANY

WELL SORGHUM GULCH #19

FIELD SORGHUM GULCH

COUNTY RIO BLANCO STATE COLORADO

LOCATION NW NW NW

Sec. Twp. Rge.

Other Services: BHC-GR, TEMP LL-7 FDC-GR

Permanent Datum: G.L., Elev. 6370
Log Measured From G.L., 0 Ft. Above Perm. Datum
Drilling Measured From G.L.

Elev.: K.B. ---- D.F. ---- G.L. 6370

| | | | | |
|---|---|---|---|---|
| Date | 9/24/74 | | | |
| Run No. | ONE | | | |
| Depth—Driller | 920 | | | |
| Depth—Logger | 928 | | | |
| Btm. Log Interval | 924 | | | |
| Top Log Interval | 152 | | | |
| Casing—Driller | 7" @ 150 | @ | @ | @ |
| Casing—Logger | 152 | | | |
| Bit Size | 6 1/4 | | | |
| Type Fluid in Hole | WATER | | | |
| Dens. / Visc. | | | | |
| pH / Fluid Loss | ml | ml | ml | ml |
| Source of Sample | | | | |
| $R_m$ @ Meas. Temp. | @ °F | @ °F | @ °F | @ °F |
| $R_{mf}$ @ Meas. Temp. | @ °F | @ °F | @ °F | @ °F |
| $R_{mc}$ @ Meas. Temp. | @ °F | @ °F | @ °F | @ °F |
| Source: $R_{mf}$ $R_{mc}$ | | | | |
| $R_m$ @ BHT | @ °F | @ °F | @ °F | @ °F |
| Time Since Circ. | | | | |
| Max. Rec. Temp. | 81.5 °F | °F | °F | °F |
| Equip. / Location | 7683 VERN | | | |
| Recorded By | HAUGAARD | | | |
| Witnessed By | ELLARD, TA | | | |

SWS-1366-F

FOLD HERE

The well name, location and borehole reference data were furnished by the customer.

REMARKS Sr. TRACED FROM SEPARATE [illegible] RUN.

Changes in Mud Type or Additional Samples

| Date | Sample No. | Type Log | Depth | Scale Up Hole | Scale Down Hole |
|---|---|---|---|---|---|
| Depth—Driller | | | | | |
| Type Fluid in Hole | | | | | |
| Dens. / Visc. | | | | | |
| pH / Fluid Loss | ml | | | | |
| Source of Sample | | | | | |
| $R_m$ @ Meas. Temp. | @ °F | @ °F | @ °F | @ °F | @ °F |
| $R_{mf}$ @ Meas. Temp. | @ °F | @ °F | @ °F | @ °F | @ °F |
| $R_{mc}$ @ Meas. Temp. | @ °F | @ °F | @ °F | @ °F | @ °F |
| Source: $R_{mf}$ $R_{mc}$ | | | | | |
| $R_m$ @ BHT | @ °F | @ °F | @ °F | @ °F | @ °F |
| $R_{mf}$ @ BHT | @ °F | @ °F | @ °F | @ °F | @ °F |
| $R_{mc}$ @ BHT | @ °F | @ °F | @ °F | @ °F | @ °F |

Equipment Data

| Run No. | Tool Type | Pad Type | Tool Pos. | Other |
|---|---|---|---|---|
| | | | | |

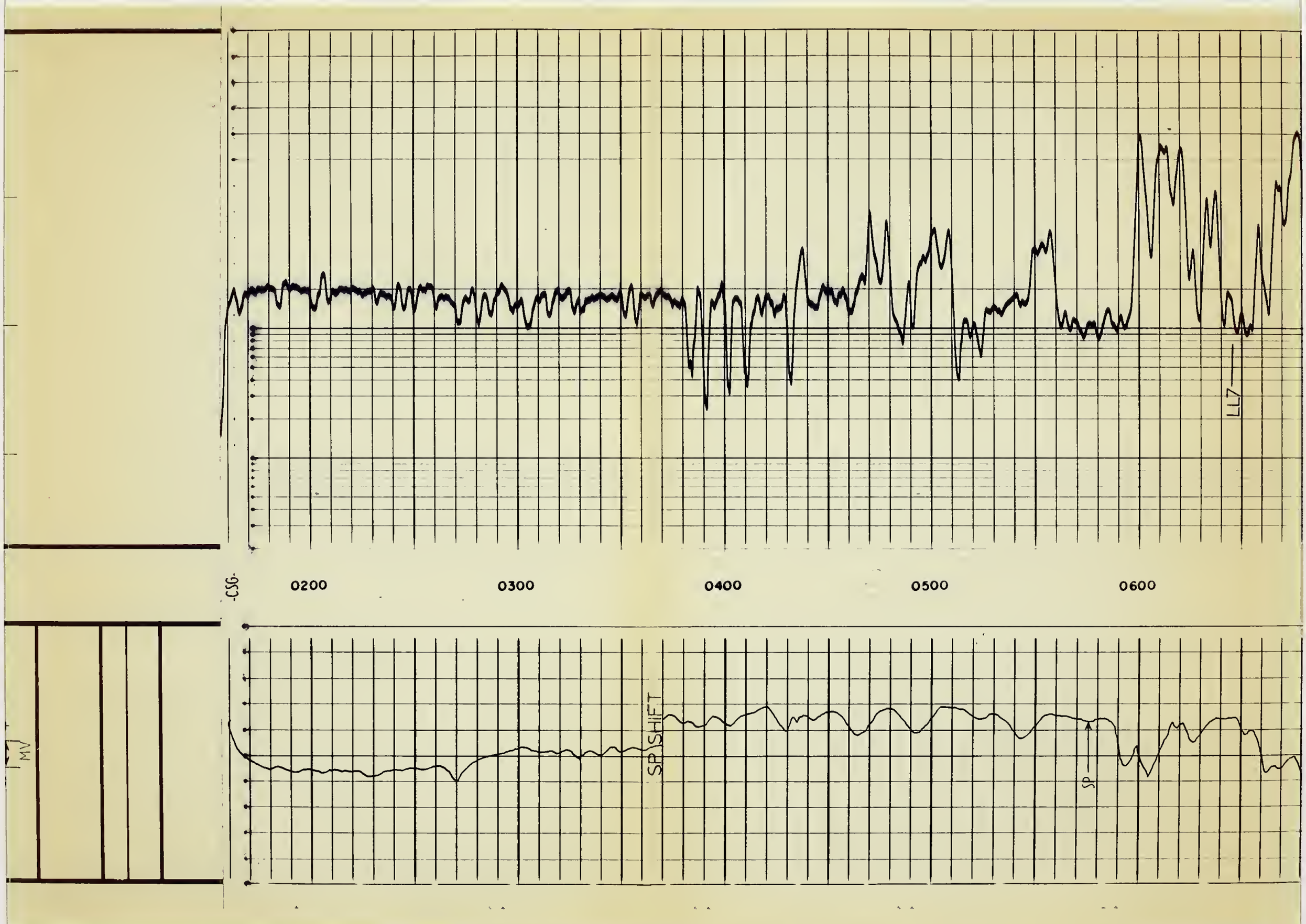
Equip. Used: CART. No.
PANEL No.
SONDE No.
Spacing: BEAM WIDTH:
GUARD LENGTH:

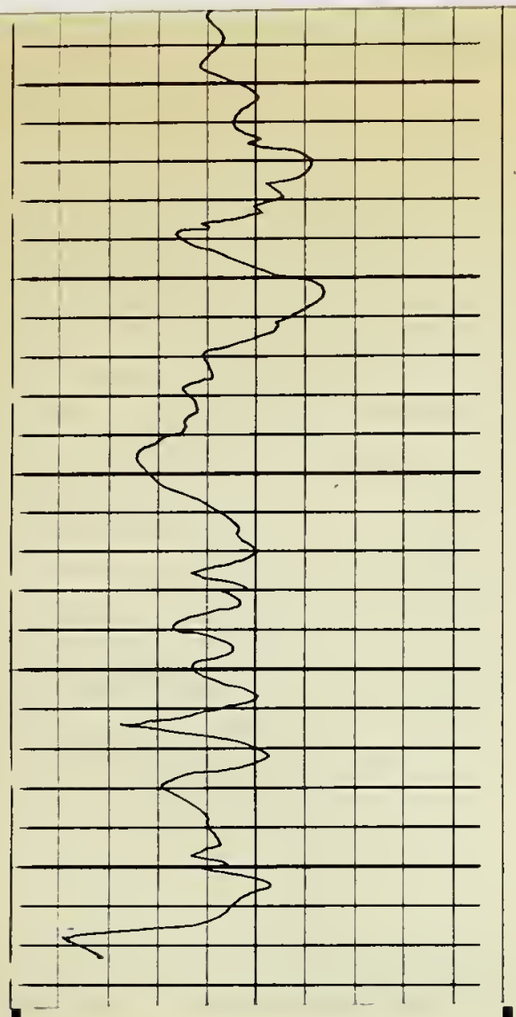
RESISTIVITY ohms. $m^2/m$

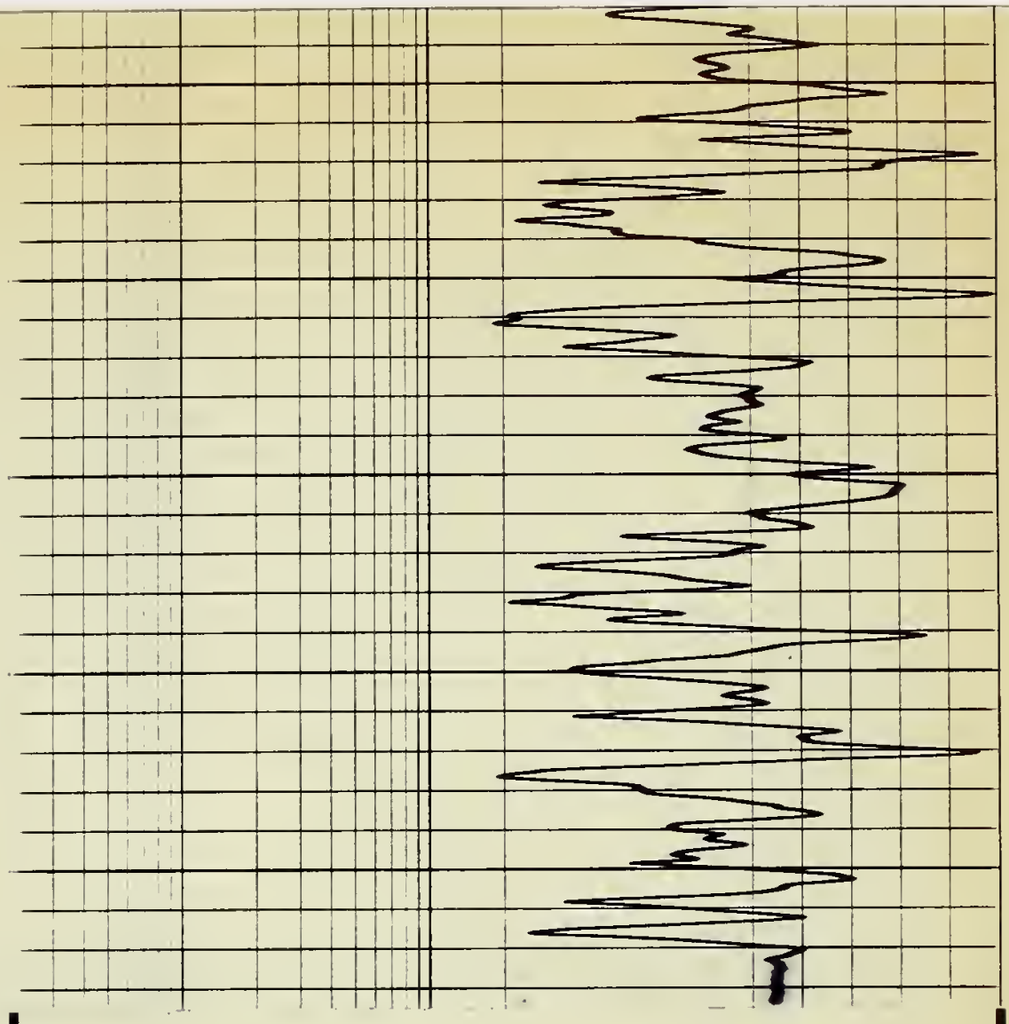
LATEROLOG

Depths

SPONTANEOUS POTENTIAL millivolts


-117-
-CSG-
0200
0300
0400
0500
0600
MV
SP SHIFT
SP





0700

0800

0900

+ 20 MV −

LATEROLOG

02.0 10 100 1000 10000 20000

**SPONTANEOUS-POTENTIAL**
MILLIVOLTS

DEPTHS

**RESISTIVITY**
OHMS. M²/M

## DETAIL LOG
5" = 100'

**SPONTANEOUS-POTENTIAL**
MILLIVOLTS

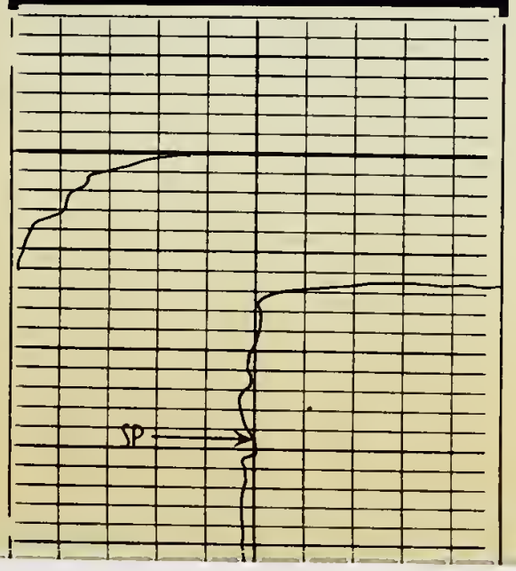
DEPTHS

**RESISTIVITY**
OHMS. M²/M

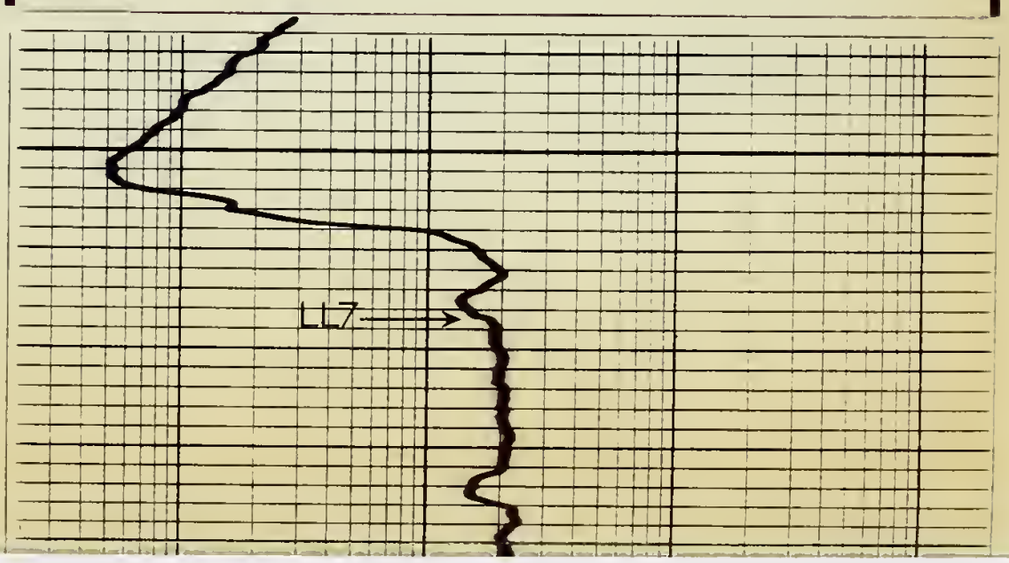
20
− + MV

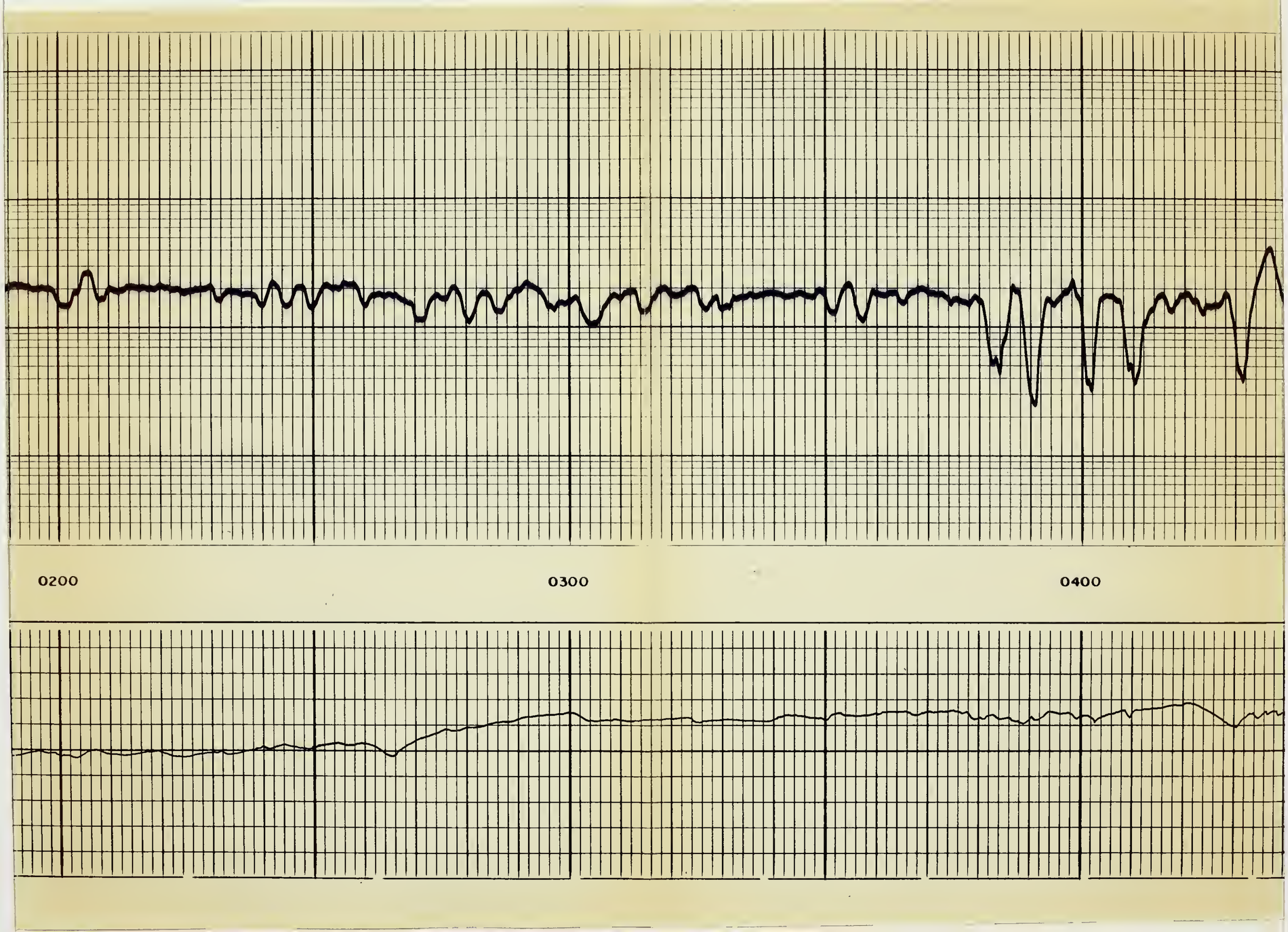
LATEROLOG

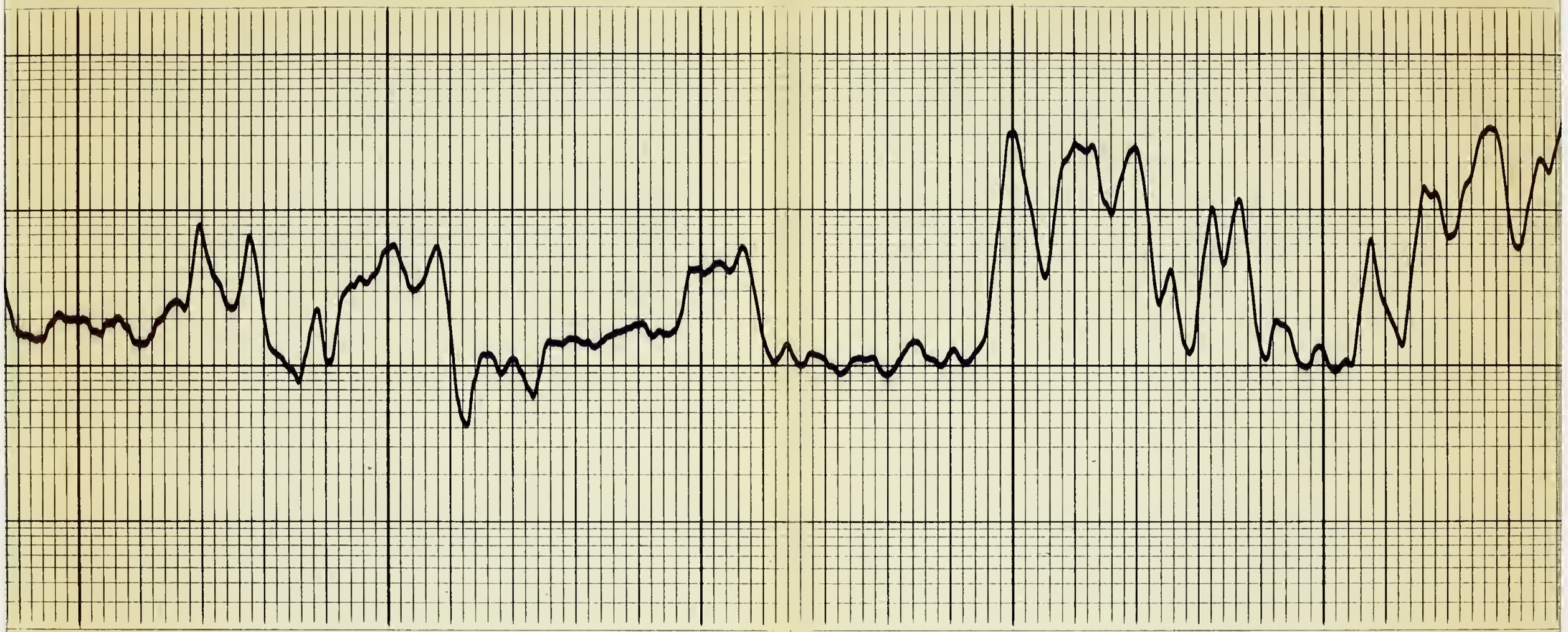
02.0 1.0 100 1000 10000 20000




-CSG-

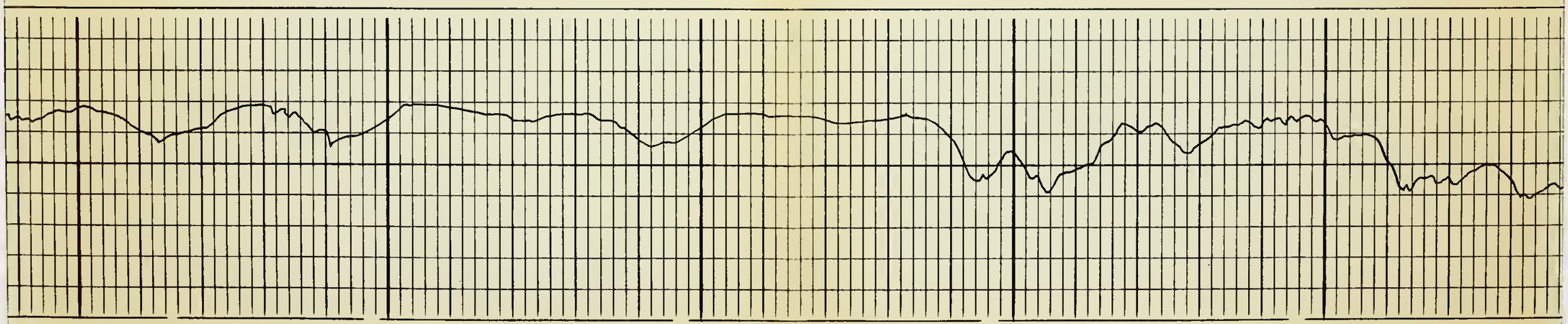


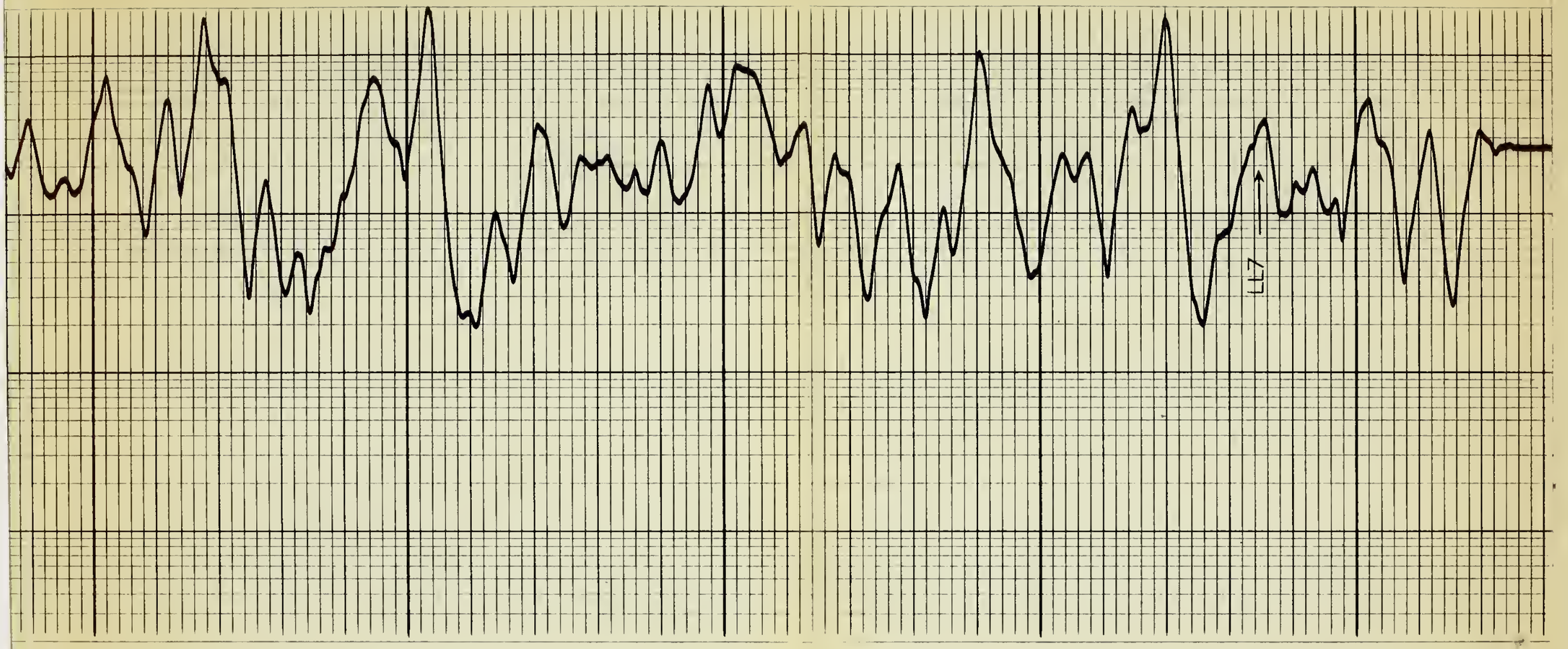

0200
0300
0400



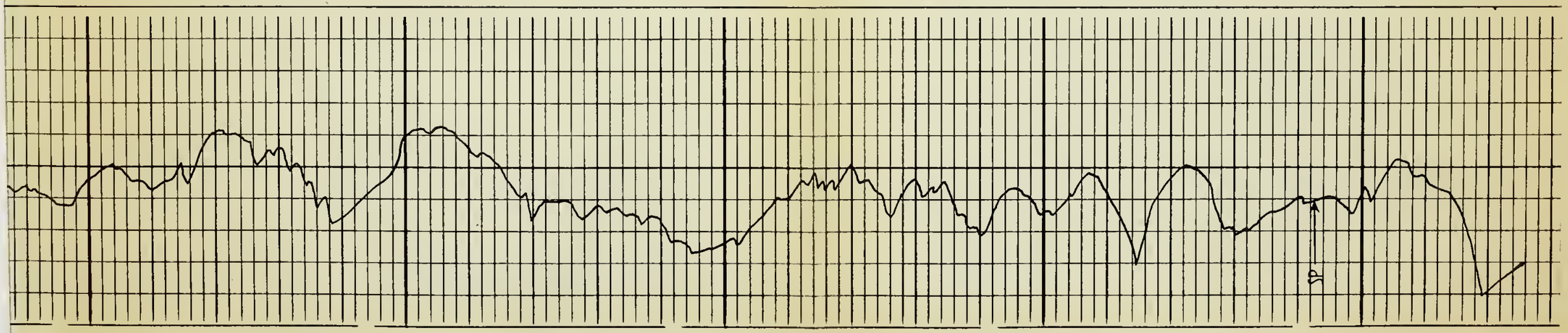
0500

0600

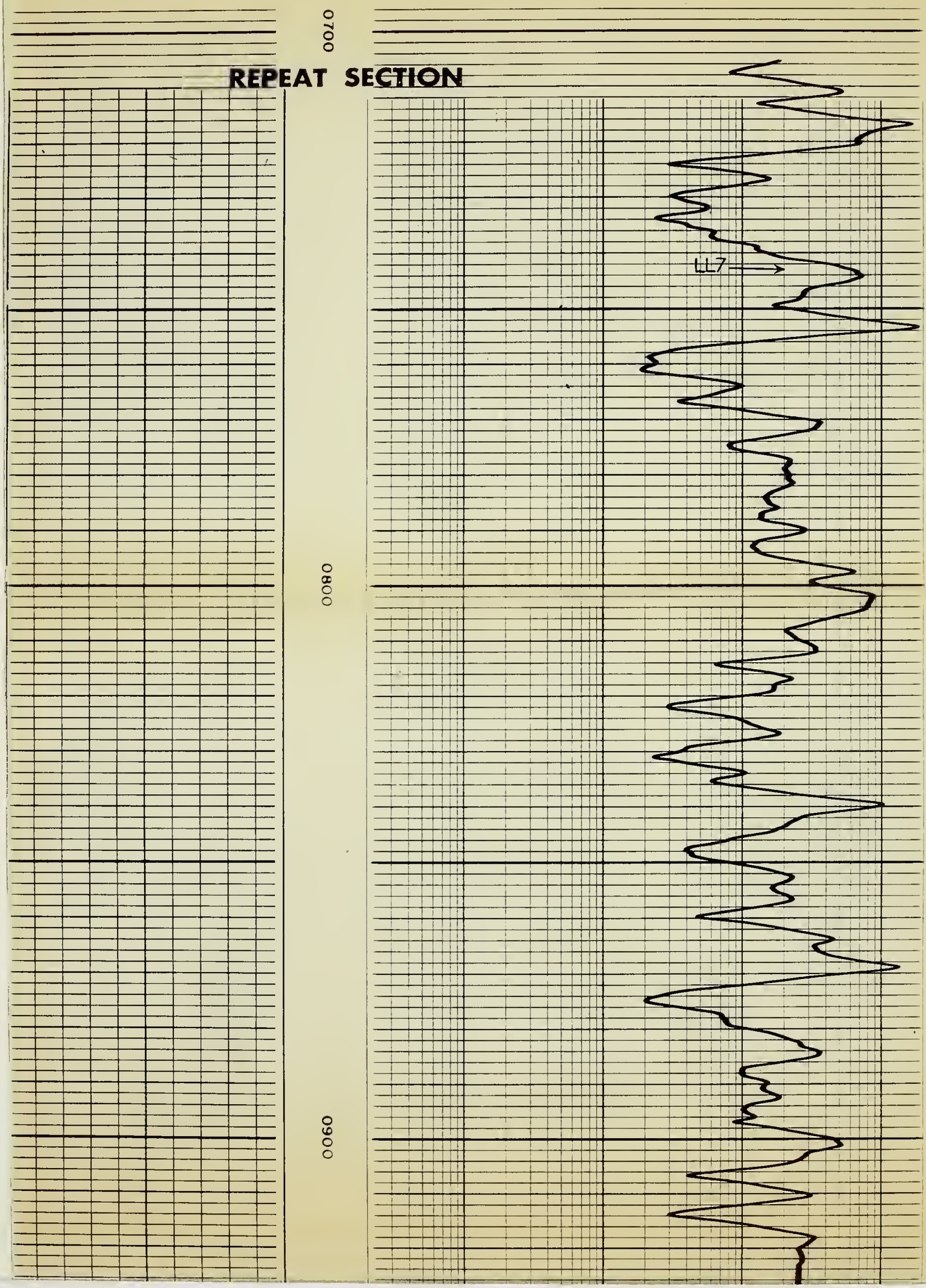


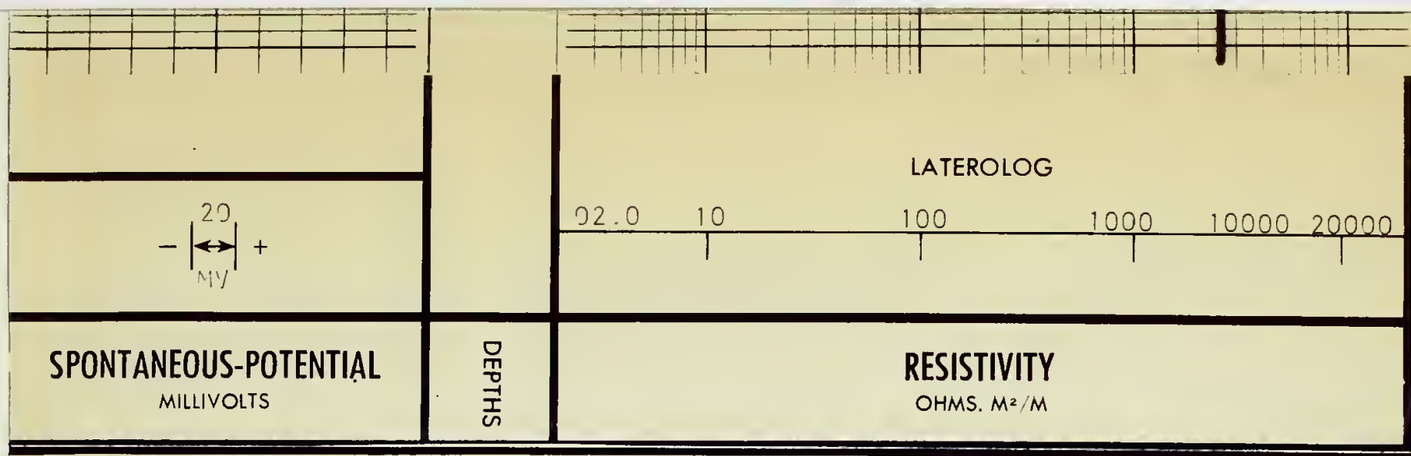



0700 0800 0900



REPEAT SECTION






COMPANY ATLANTIC RICHFIELD COMPANY

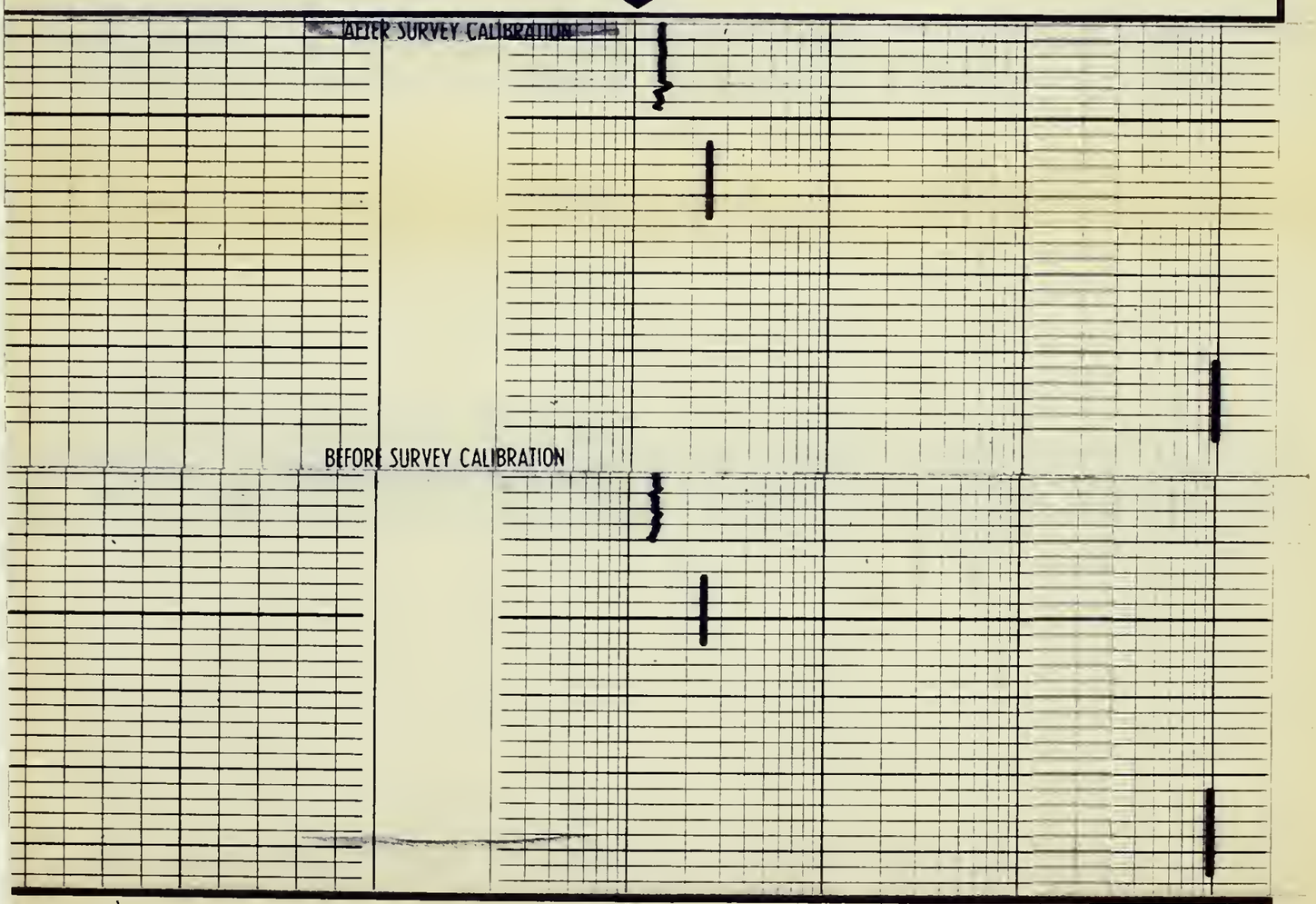
WELL SORGHUM GULCH #19

FIELD SORGHUM GULCH

COUNTY RIO BLANCO STATE COLORADO

SCHL. FR 924
SCHL. TD 928
DRLR TD 920
Elev:
KB ---
DF --
GL 6370

## CALIBRATION RECORD




## CALIBRATION RECORD

COMPANY ATLANTIC RICHFIELD COMPANY

WELL SORGHUM GULCH #19

FIELD SORGHUM GULCH

COUNTY RIO BLANCO STATE COLORADO

SCHL. FR 924
SCHL. TD 928
DRLR TD 920
Elev:
KB
DF
GL 6370

Schlumberger

# COMPENSATED FORMATION DENSITY LOG

Gamma-Gamma

COUNTY RIO BLANCO
FIELD or LOCATION SORGHUM GULCH
WELL SORGHUM GULCH #19
COMPANY ATLANTIC RICHFIELD COMPANY

COMPANY ATLANTIC RICHFIELD COMPANY

WELL SORGHUM GULCH #19

FIELD SORGHUM GULCH

COUNTY RIO BLANCO STATE COLORADO

Location:
NW NW NW
Sec. 5 Twp. 3S Rge. 96W

Other Services:
LL7
BHC-GR
AMP
TEMP

Permanent Datum: G.L. ; Elev.: 6370
Log Measured From G.L. , 0 Ft. Above Perm. Datum
Drilling Measured From G.L.

Elev.: K.B. --
D.F. --
G.L. 6370

| | | | | |
|---|---|---|---|---|
| Date | 9/24/74 | | | |
| Run No. | ONE | | | |
| Depth—Driller | 920 | | | |
| Depth—Logger | 922 | | | |
| Btm. Log Interval | 920 | | | |
| Top Log Interval | 152 | | | |
| Casing—Driller | 7 @ 150 | @ | @ | @ |
| Casing—Logger | 152 | | | |
| Bit Size | 6 1/4 | | | |
| Type Fluid in Hole | WATER | | | |
| Fluid Level | FULL | | | |
| Dens. / Visc. | -- / - | / | / | / |
| pH / Fluid Los | -- / - ml | / ml | / ml | / ml |
| Source of Sample | -- | | | |
| $R_m$ @ Meas. Temp. | -- @ -- °F | @ °F | @ °F | @ °F |
| $R_{mf}$ @ Meas. Temp. | @ °F | @ °F | @ °F | @ °F |
| $R_{mc}$ @ Meas. Temp. | - @ -- °F | @ °F | @ °F | @ °F |
| Source: $R_{mf}$ / $R_{mc}$ | - / -- | / | / | / |
| $R_m$ @ BHT | - @ - °F | @ °F | @ F | @ °F |
| Time Since Circ. | -- | | | |
| Max. Rec. Temp. | 81.5 °F | °F | °F | °F |
| Equip. / Location | 7183 / VERN | / | / | / |
| Recorded By | HAUGAARD | | | |
| Witnessed By | ELLARD, TAIT | | | |

FOLD HERE

The well name location and borehole reference data were furnished by the customer.

SCALE CHANGES

| Type Log | Depth | Scale Up Hole | Scale Down Hole |
|---|---|---|---|
| | | | |

LOGGING DATA

FDC Selectors

| Liquid Density | Grain Density | Hole Fluid | Porosity Scale | From | To |
|---|---|---|---|---|---|
| | | | | | |

REMARKS

Service Order No. - 7033

API Serial No. -

CHANGES IN MUD TYPE OR ADDITIONAL SAMPLES

| Date | Sample No. | | | |
|---|---|---|---|---|
| Depth - Driller | | | | |
| Type Fluid | | | | |
| Source of Sample | | | | |
| $R_m$ @ Meas. Temp. | @ °F | @ °F | @ °F | @ °F |
| $R_{mf}$ @ Meas. Temp. | @ °F | @ °F | @ °F | @ °F |
| $R_{mc}$ @ Meas. Temp. | @ °F | @ °F | @ °F | @ °F |
| $R_m$ @ BHT | @ °F | @ °F | @ °F | @ °F |
| Dens. / Visc. | / | / | / | / |
| ph / Fluid Loss | / ml | / ml | / ml | / ml |
| % Water by Vol. | | | | |
| % Oil by Vol. | | | | |
| % Solids by Vol. | | | | |
| Solids Av. Sp. Gr. | | | | |

EQUIPMENT DATA

| Run No. | ONE | | | |
|---|---|---|---|---|
| Panel No. | EA-42 | | | |
| Cart No. | EA-13 | | | |
| Skid No. | D-320 | | | |
| Sonde No. | EA-377 | | | |
| Source | 2936 | | | |
| Calibrator | 544 | | | |
| GR Cart. | 1-204 | | | |
| TTR | --- | | | |
| Mem Panel | ILP-A 163 | | | |

BIT SIZE/CASING DATA

| Bit | From | To | Csg. Size | Csg. Wt. | From | To |
|---|---|---|---|---|---|---|
| 6 1/4 | 920 | 150 | 7" | -- | 150 | SURF |

## CALIBRATION DATA

| Run No. | Gamma Ray | | | FDC — Before Log — ACPS | | FDC — After Log — ACPS | |
|---|---|---|---|---|---|---|---|
| | API Scale | Background CPS | Total CPS | $P_1$ | $P_2$ | $P_1$ | $P_2$ |
| 1 | 0-200 | 100 | 500 | 340 | 720 | 340 | 720 |
| 2 | | | | | | | |
| 3 | | | | | | | |
| 4 | | | | | | | |

All interpretations are opinions based on inferences from electrical or other measurements and we cannot, and do not guarantee the accuracy or correctness of any interpretations, and we shall not, except in the case of gross or willful negligence on our part, be liable or responsible for any loss, costs, damages or expenses incurred or sustained by anyone resulting from any interpretation made by any of our officers, agents or employees. These interpretations are also subject to Clause 7 of our General Terms and Conditions as set out in our current Price Schedule.

**CALIPER**
HOLE DIAM. IN INCHES

5 — 15

**GAMMA RAY**
API UNITS

0 — 150

150 — 300

DEPTHS

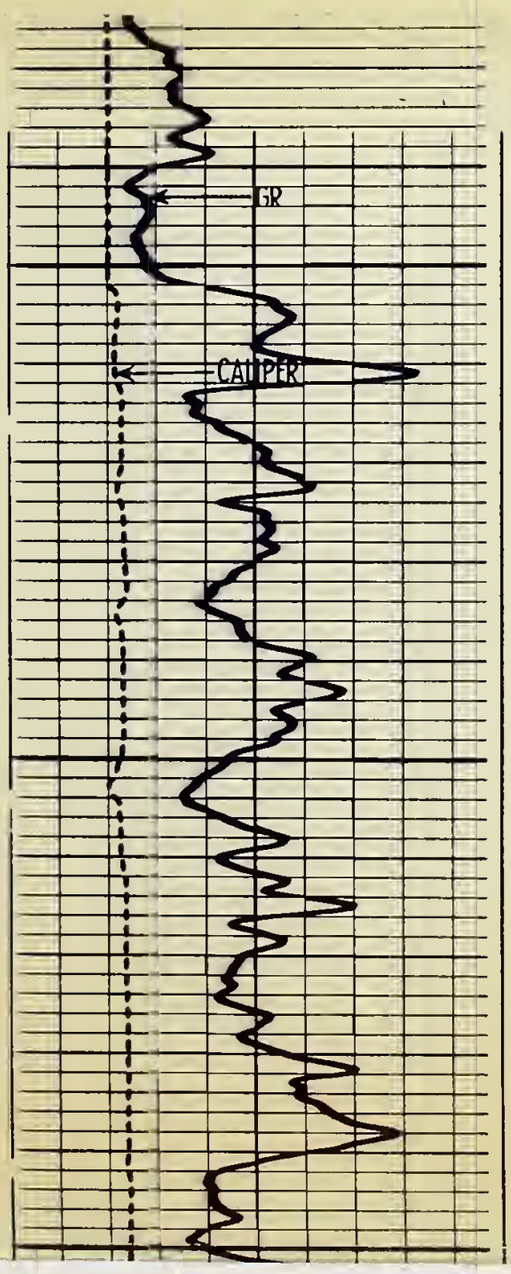
—.25 — 0 — +.25

**CORRECTION**
GRAMS/CC.

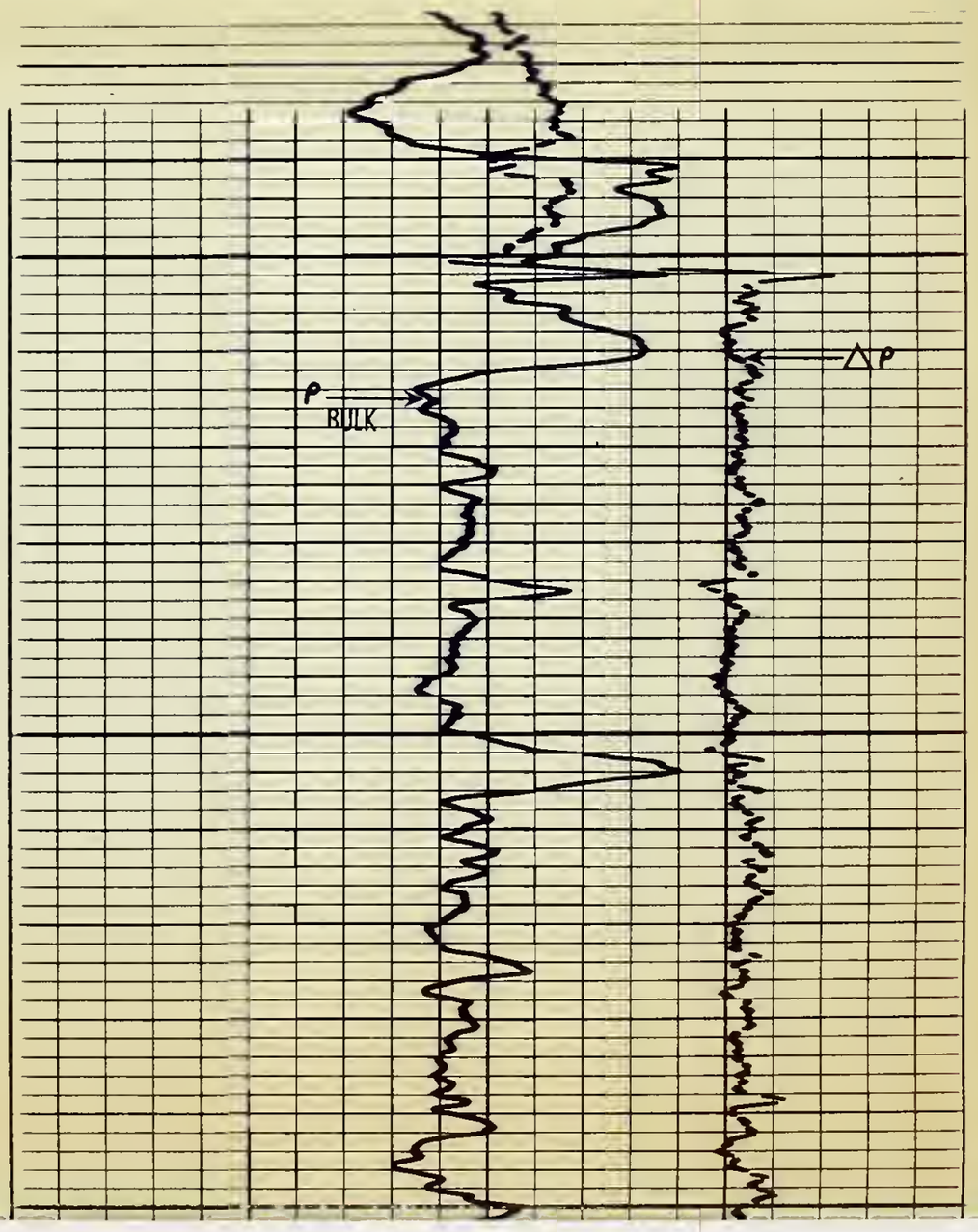
**BULK DENSITY**
GRAMS CC.

1.7 — 2.2 — 2.7

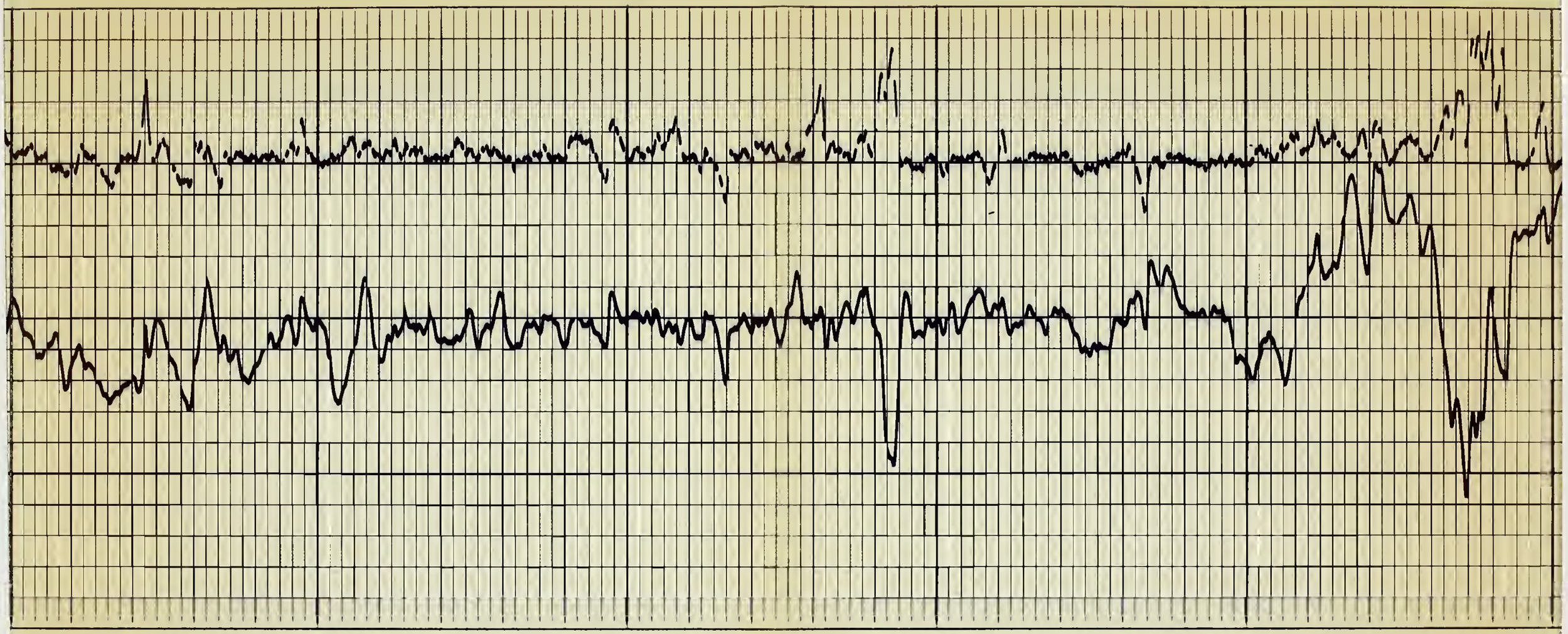
.7 — 1.2 — 1.7



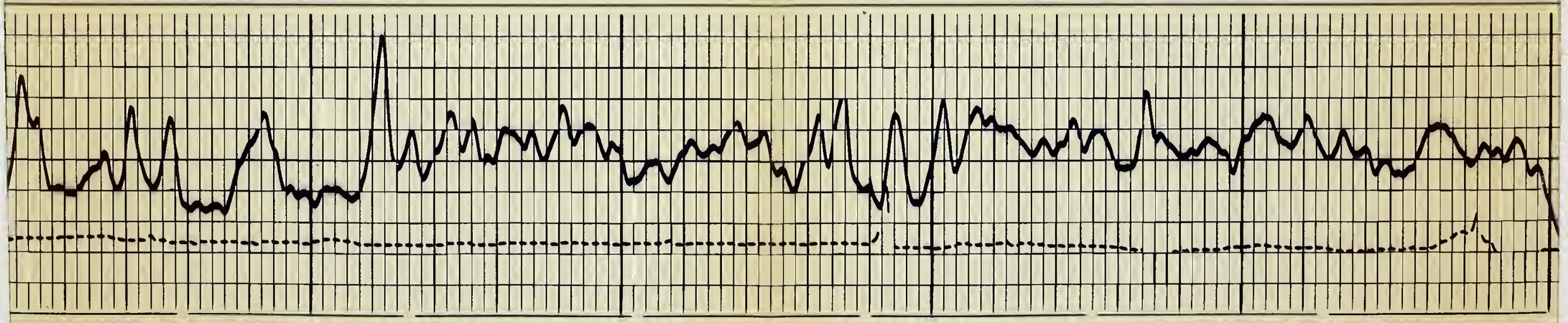


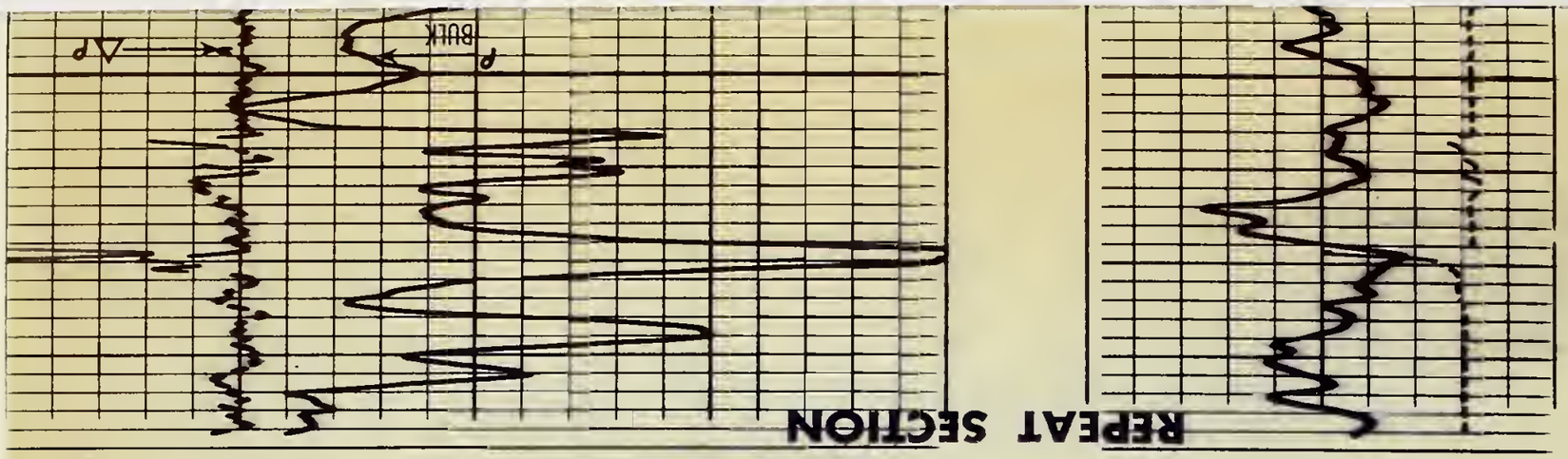

0200

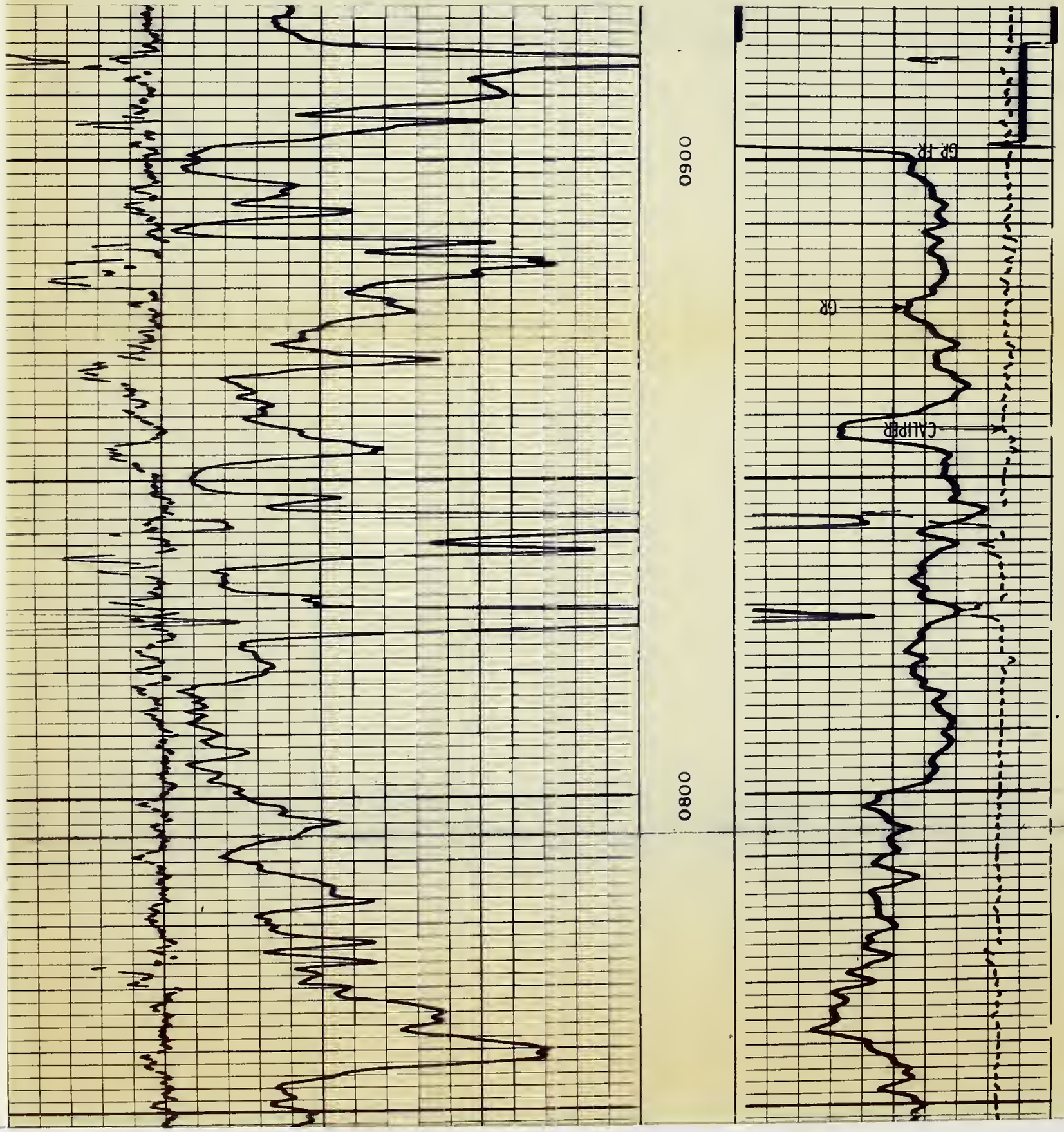


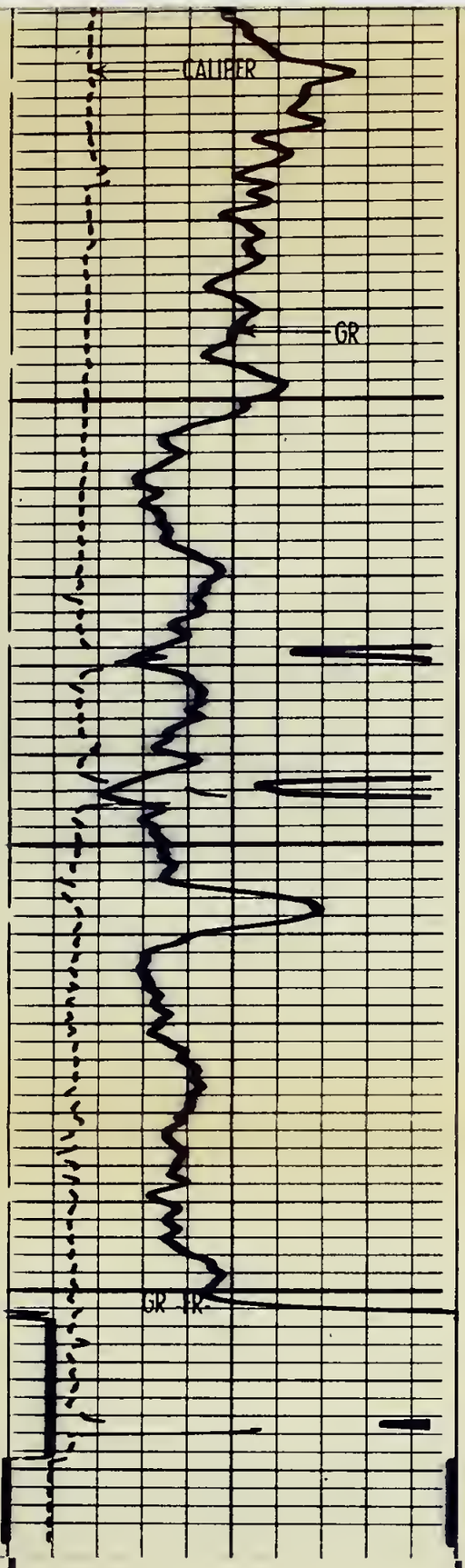
0300 0400 050



500
0600
0700

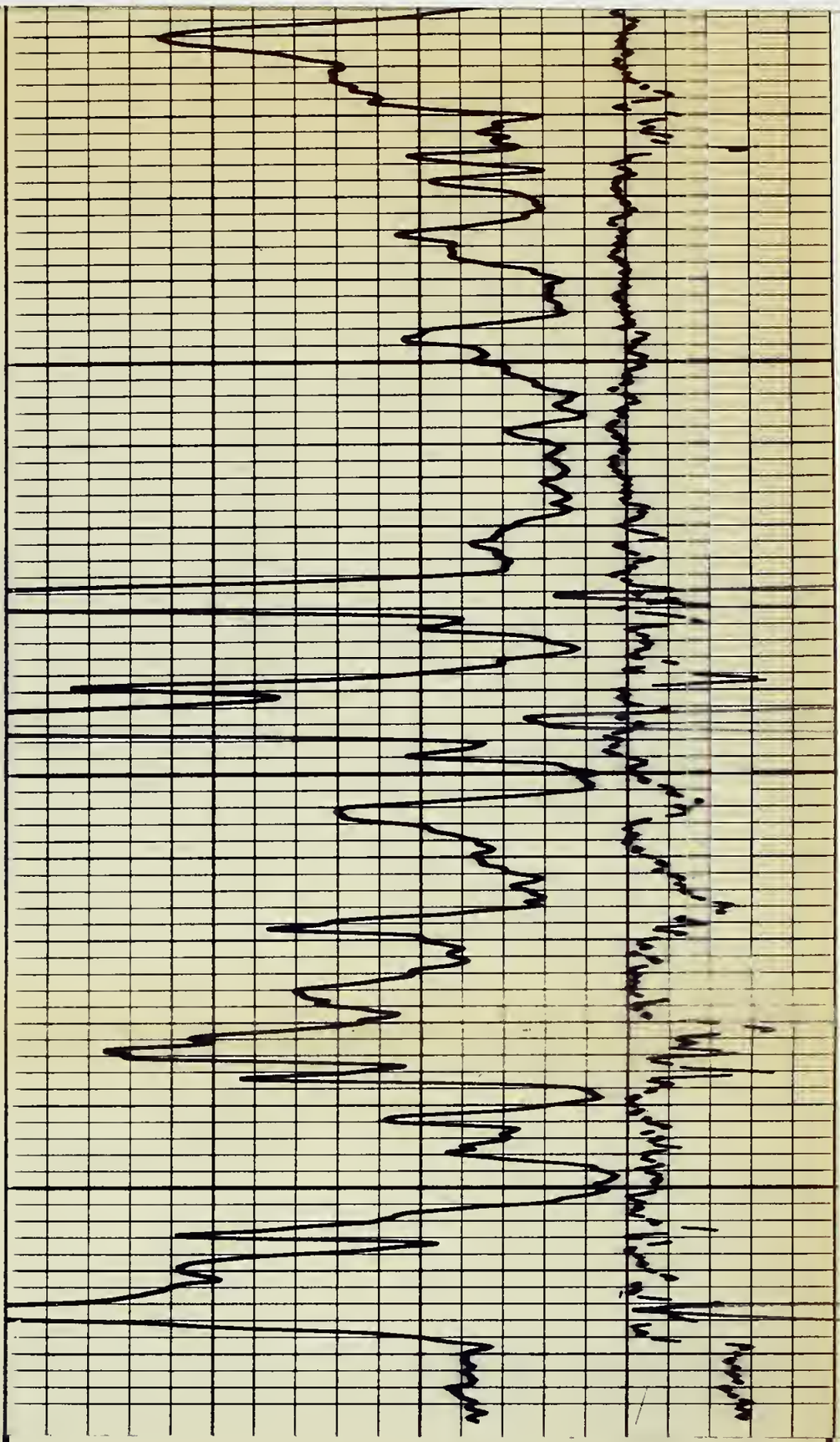

REPEAT SECTION
$\Delta\rho$
$\rho_{BULK}$


0900
0800
GR
GR IR
CALIPER




0800

0900



0 150

150 300

**GAMMA RAY**

API UNITS

5 15

**CALIPER**

HOLE DIAM. IN INCHES

Depth

1.7 2.2 2.7

.7 1.2 1.7

**BULK DENSITY**

GRAMS/CC.

−.25 0 + .25

**CORRECTION**

GRAMS CC

COMPANY _____ Rm ___ @ ___ °F SCHL. FR
BHT ___ °F SCHL TD
WELL _____
FIELD _____ KB ___
DF ___
COUNTY _____ STATE _____ GL 3370

# CALIBRATION RECORD

AFTER SURVEY CALIBRATION

10

8

2

1

BEFORE SURVEY CALIBRATION

10

8

2

1

7

6

5

4

3

2

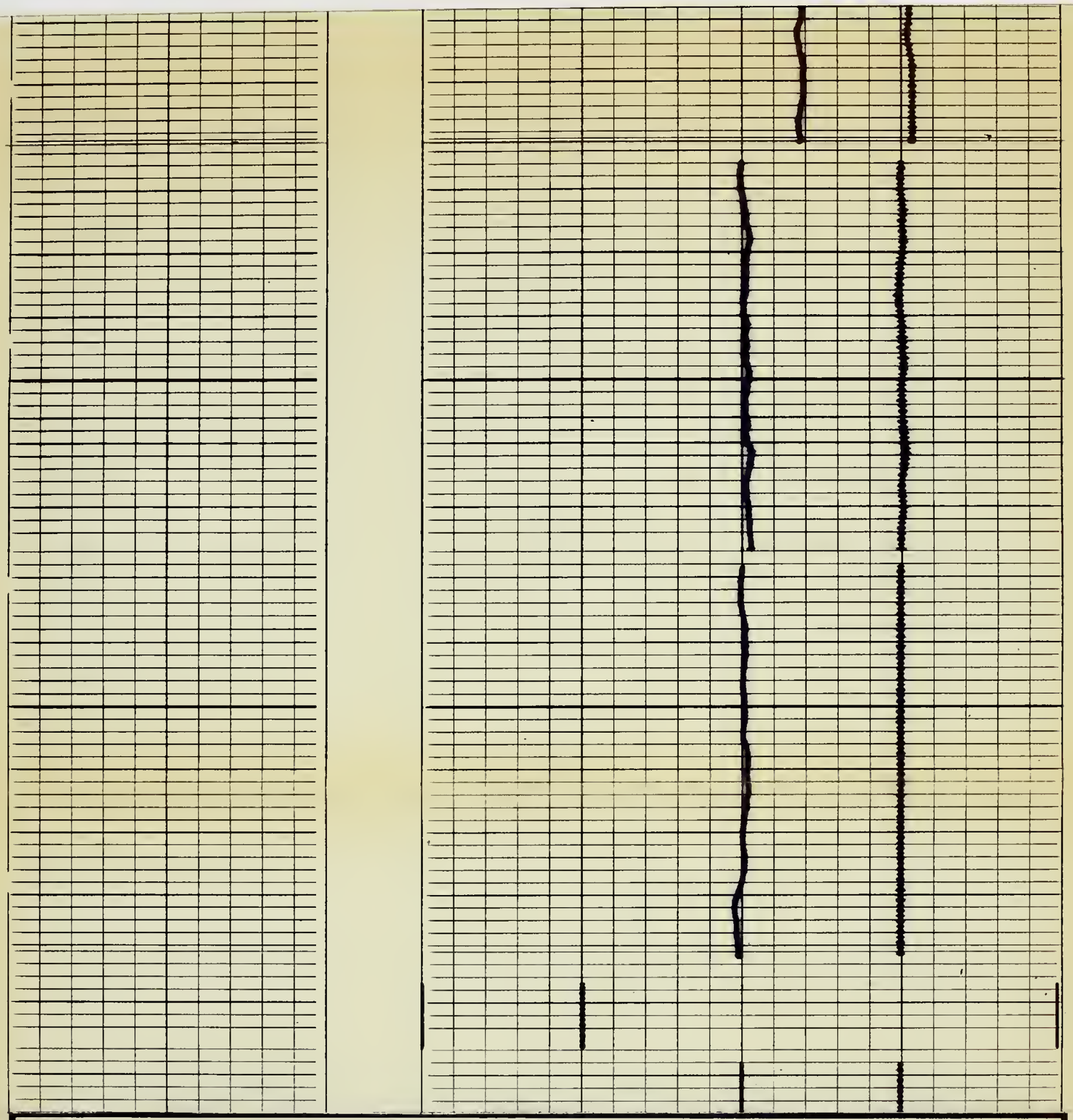
1

BLOCK CALIBRATION

01/30/74

$P_1 = 342$

$P_2 = 716$



## CALIBRATION RECORD

COMPANY ATLANTIC RICHFIELD COMPANY

WELL SORGHUM GULCH #19

FIELD SORGHUM GULCH

COUNTY RIO BLANCO STATE COLORADO

SCHL. FR 920
SCHL. TD 922
DRLR TD 920
Elev:
KB ----
DF ----
GL 6370

SWS-1938-B

Schlumberger

# TEMPERATURE LOG

COUNTY RIO BLANCO
FIELD or LOCATION SORGHUM GULCH
WELL #19
COMPANY ATLANTIC RICHFIELD

COMPANY ATLANTIC RICHFIELD

WELL SORGHUM GULCH #19

FIELD SORGHUM GULCH

COUNTY RIO BLANCO STATE COLORADO

LOCATION
NW NW NW

Sec. 5 Twp. 3S Rge. 96W

Other Services:
HRT

Permanent Datum: G.L. ; Elev.: 6370
Log Measured From G.L. , Ft. Above Perm. Datum
Drilling Measured From G.L.

Elev.: K.B. ----
D.F. ----
G.L. 6370

| | | | |
|---|---|---|---|
| Dote | 9/24/74 | | |
| Run No. | ONE | | |
| Depth—Driller | 920 | | |
| Depth—Logger | 922 | | |
| Btm. Log Intervol | 921 | | |
| Top Log Intervol | 30 | | |
| Cosing—Driller | @ | @ | @ |
| Cosing—Logger | | | |
| Cosing Size 1 | To | To | To |
| 2 | To | To | To |
| Cosing Weight 1 | | | |
| 2 | | | |
| Cosing Thickness 1 | | | |
| 2 | | | |
| Bit Size 1 | To | To | To |
| 2 | To | To | To |
| Type Fluid in Hole | | | |
| Dens. / Visc. | | | |
| Time Since Circ. | | | |
| BHT | | | |
| Equip. / Location | 7683 / VERN | | |
| Recorded By | HAUGAARD | | |
| Witnessed By | ELLARD, TAIT | | |

FOLD HERE

The well name, location and borehole reference data were furnished by the customer.

REMARKS: WELL WAS FLOWING WHILE LOGGING.
FILM LOGGED DOWN

CEMENTATION DATA

| Dote | Depth | Type of Cement | Nb of Socks | Additives | Calculated Top |
|---|---|---|---|---|---|
| | | | | | |

TEMPERATURE °F.

80 70

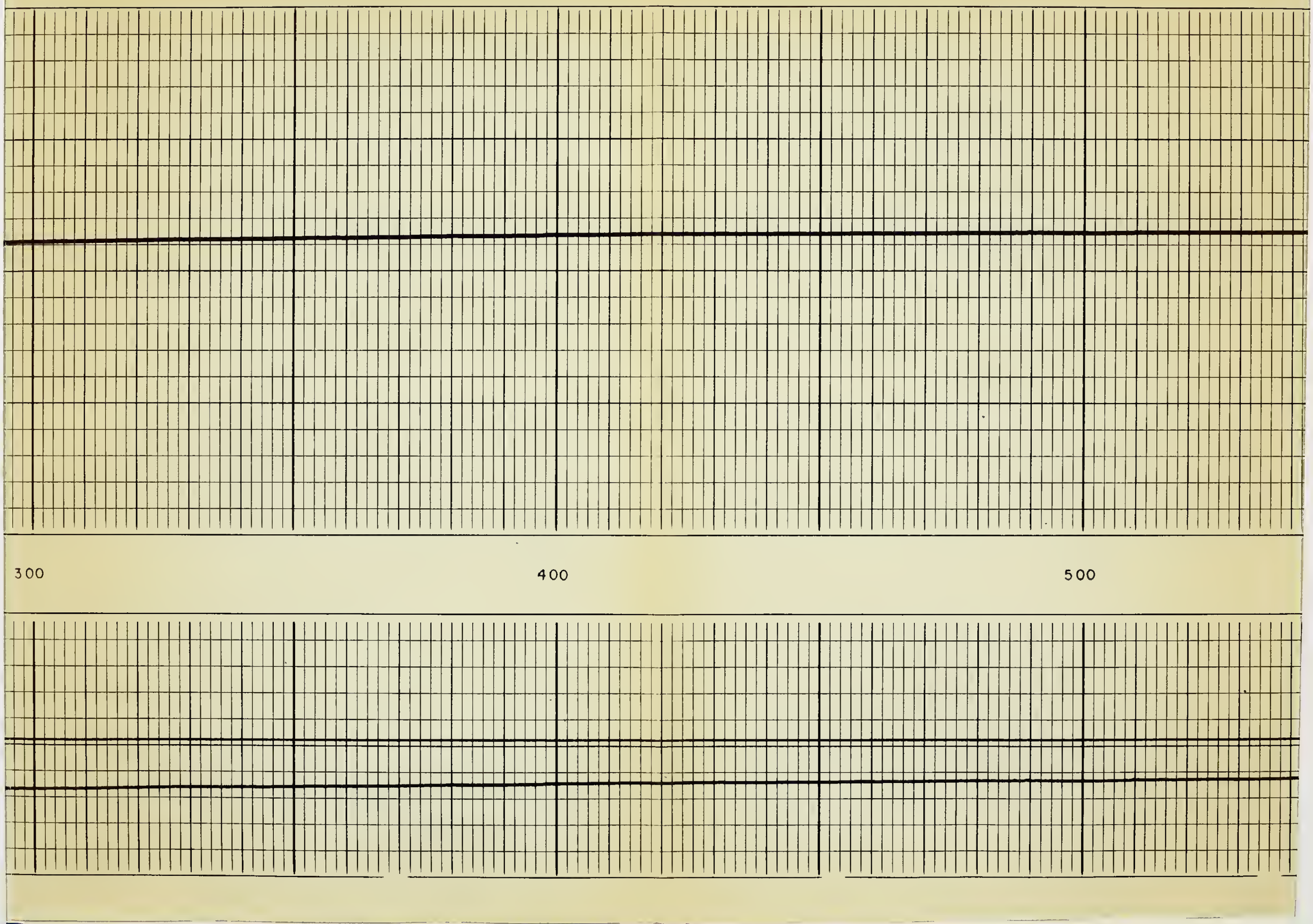
REDUCED SENSITIVITY TEMPERATURE

REDUCED
SENSITIVITY
TEMPERATURE

100

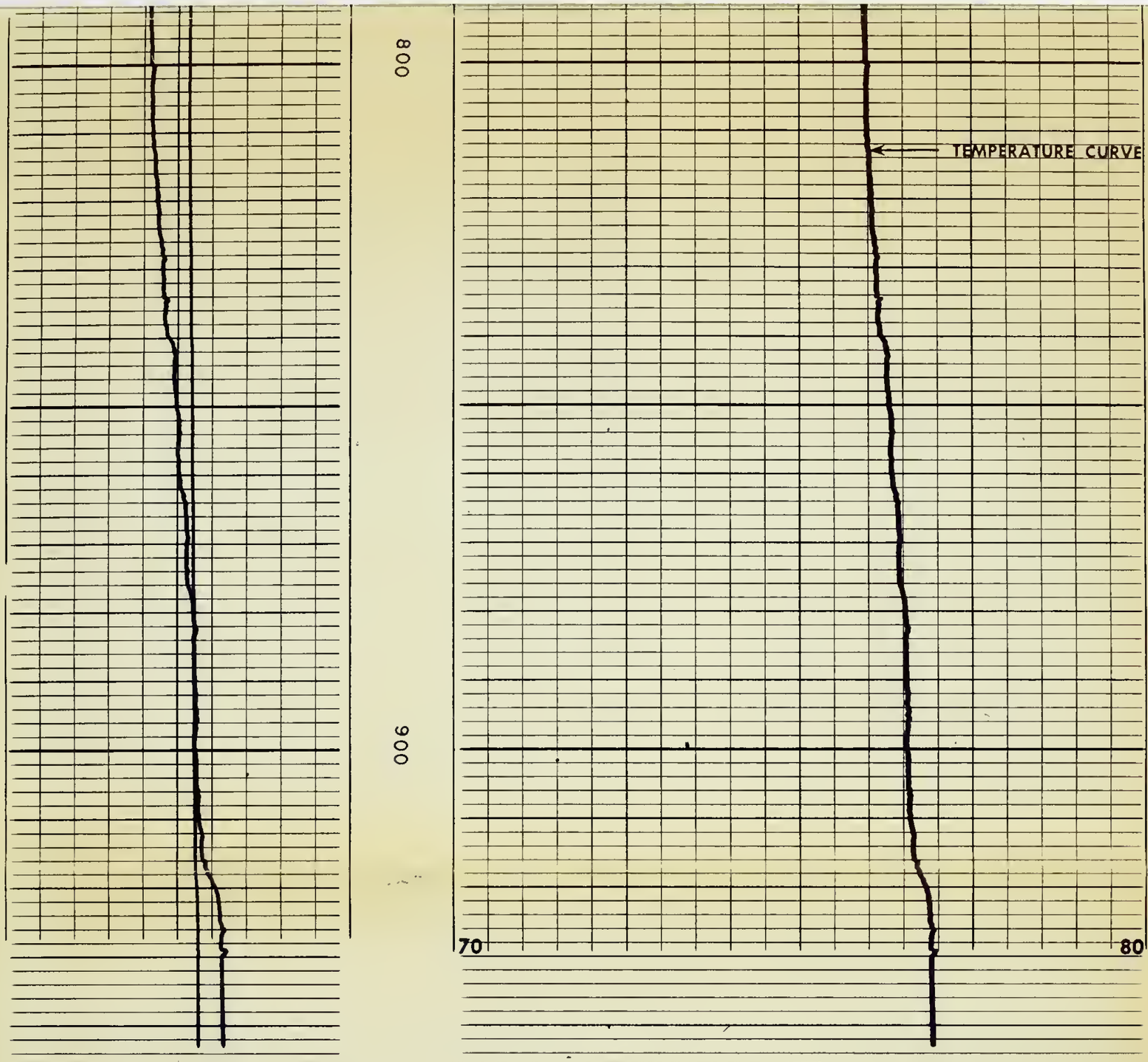
200

TEMPERATURE CURVE


300
400
500

600

700




70 80

TEMPERATURE °F.

COMPANY ATLANTIC RICHFIELD COMPANY

WELL SORGHUM GULCH #19

FIELD SORGHUM GULCH

COUNTY RIO BLANCO STATE COLORADO

SCHL. F. R. 921
SCHL. T. D. 922
DRLR. T. D. 920

EXISTING COREHOLE Cb-1

THIS ENVELOPE CONTAINS THE FOLLOWING GEOPHYSICAL LOG:

Birdwell: Temperature

II B-370

# Birdwell

## Temperature Log

FILING NO.

COMPANY ATLANTIC RICHFIELD COMPANY, ET. AL.

WELL TOSCO CB-1

FIELD

COUNTY RIO BLANCO STATE COLORADO

LOCATION: NE SW SW

SEC. 1 TWP. 3S RGE. 97W

OTHER SERVICES:

ELEVATIONS:
KB.
DF.
GL. 6760'

PERMANENT DATUM GROUND LEVEL ELEV. 6760'
LOG MEASURED FROM GL
DRILLING MEASURED FROM GL

| | | | |
|---|---|---|---|
| DATE | 29 JUNE 74 | | |
| RUN NO. | | | |
| TYPE LOG | | | |
| DEPTH—DRILLER | | | |
| DEPTH—LOGGER | 2005 | | |
| BOTTOM LOGGED INTERVAL | 2005 | | |
| TOP LOGGED INTERVAL | 370 | | |
| TYPE FLUID IN HOLE | WATER | | |
| SALINITY PPM CL. | | | |
| DENSITY LB./GAL. | | | |
| LEVEL | 357 | | |
| MAX. REC. TEMP.—DEG. F. | 97.5° | | |
| OPR. RIG TIME | 1 HR. | | |
| RECORDED BY | WILSON | | |
| WITNESSED BY | TAIT | | |
| LOCATION | LAS VEGAS | | |

| RUN NO. | BORE HOLE RECORD | | | CASING RECORD | | | |
|---|---|---|---|---|---|---|---|
| | BIT | FROM | TO | SIZE | WGT. | FROM | TO |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |

WELL DATA

| | |
|---|---|
| TYPE WELL | |
| RUN NO. | 1 |
| PROD. OR INJ. RATE | |
| WELL HEAD PRESSURE | |
| TYPE & AMT. CEMENT | |
| LENGTH OF TIME: | |
| PROD. OR INJECTING | |
| SHUT IN | |
| SINCE CEMENTING | |

PURPOSE OF SURVEY

EQUIPMENT DATA

| | |
|---|---|
| TYPE LOG | TL |
| RUN NO. | 1 |
| TOOL MODEL NO. | LDAH-6010 |
| DIAM. | 1-5/8" |
| SPEED FT./MIN. | 60 |
| T.C. - SEC. | 1 |
| SCALE | 1/4°/DIV. |

GENERAL

| | |
|---|---|
| HOIST TRUCK NO. | 2624 |
| INST. TRUCK NO. | 2624 |
| TOOL SERIAL NO. | |

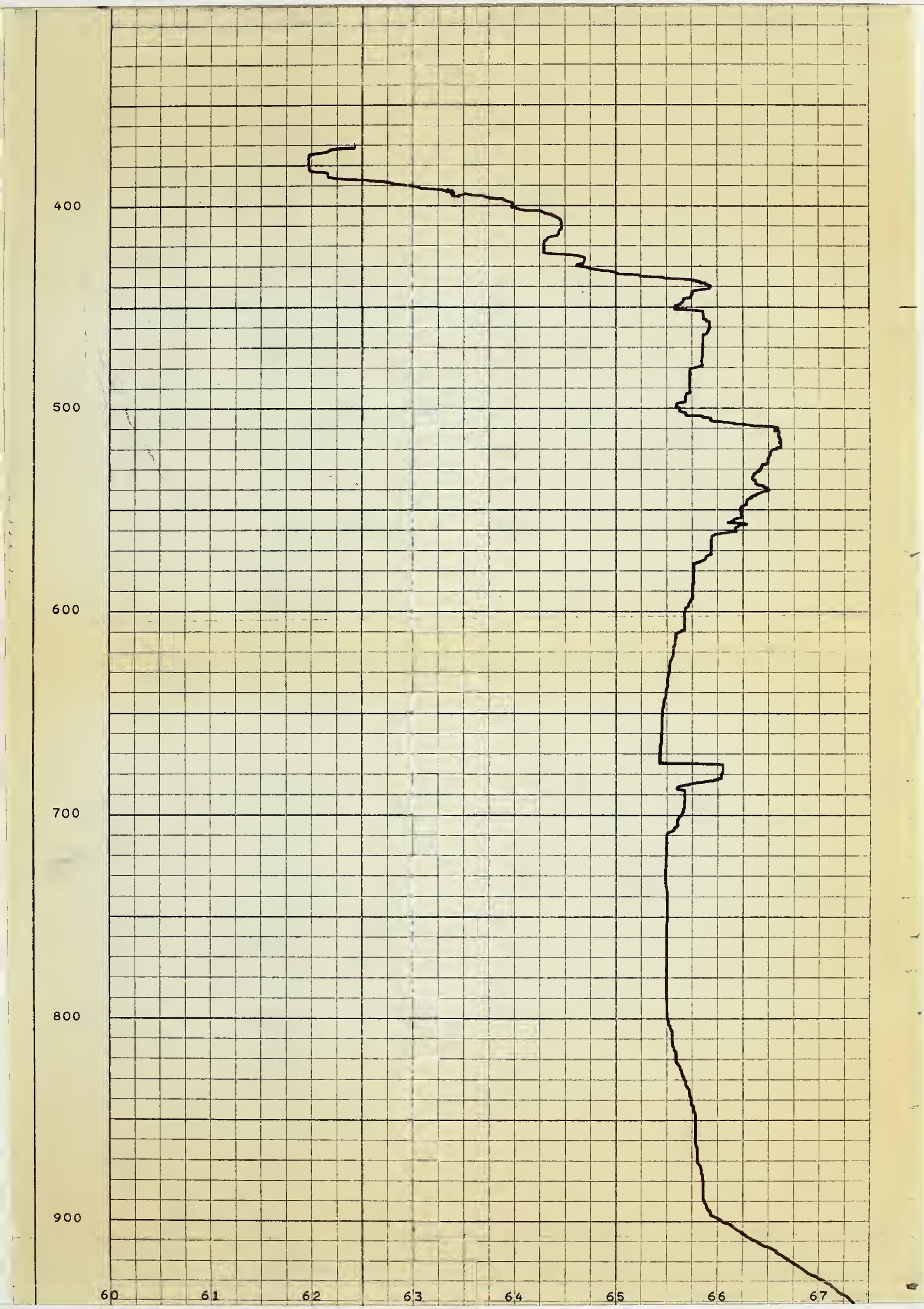
REMARKS: N.A. Means not available

TEMPERATURE
DEGREES FAHRENHEIT

60 59 58 57 56 55 54 53

DEPTH

SSC-609-B


400
500
600
700
800
900
60
61
62
63
64
65
66
67

60 61 62 63 64 65 66 67

1000

1100

68 69 70 71 72 73 74 75

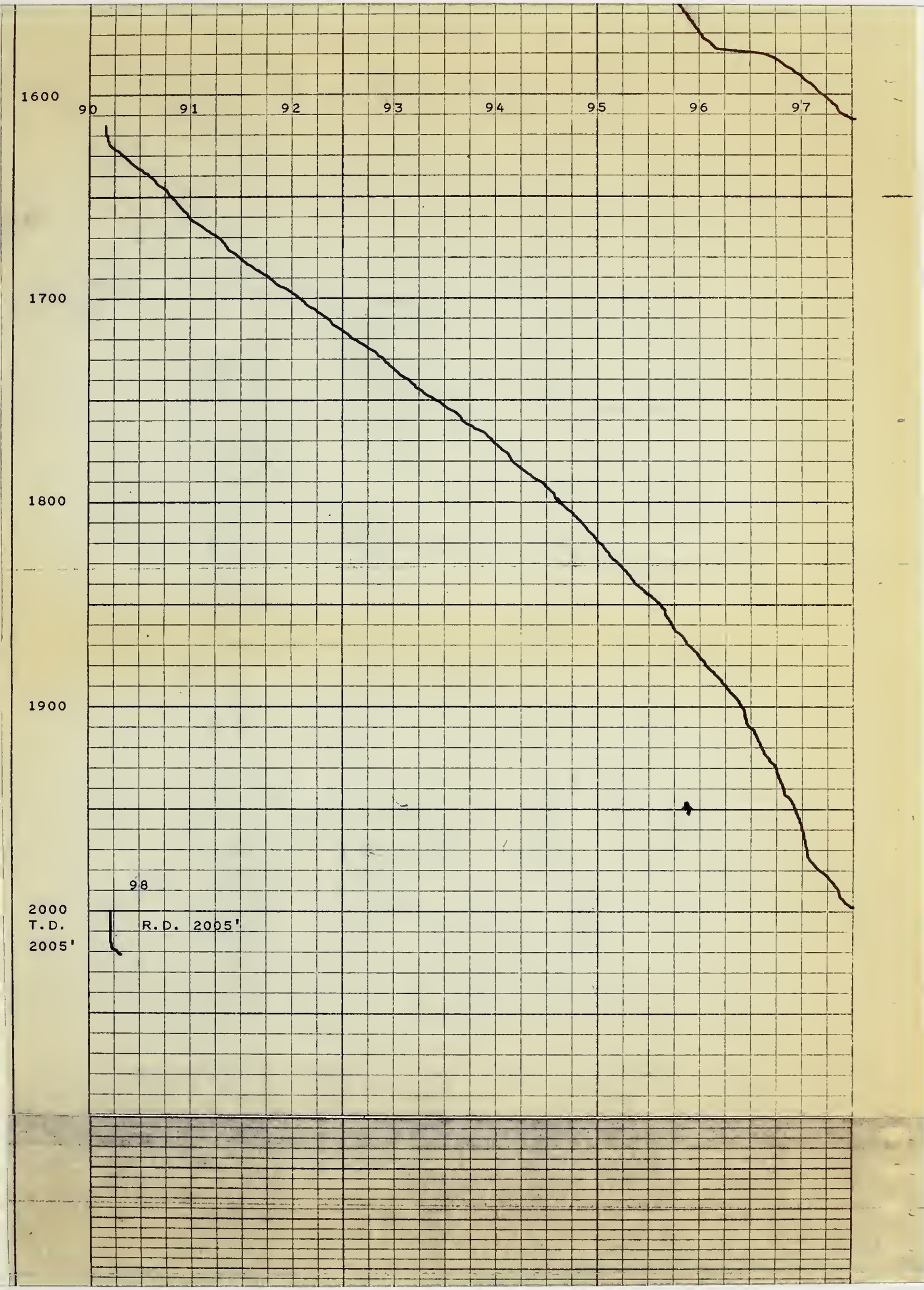
1200

1300 75 76 77 78 79 80 81 82

83 84 85 86 87 88 89 90

1400

1500

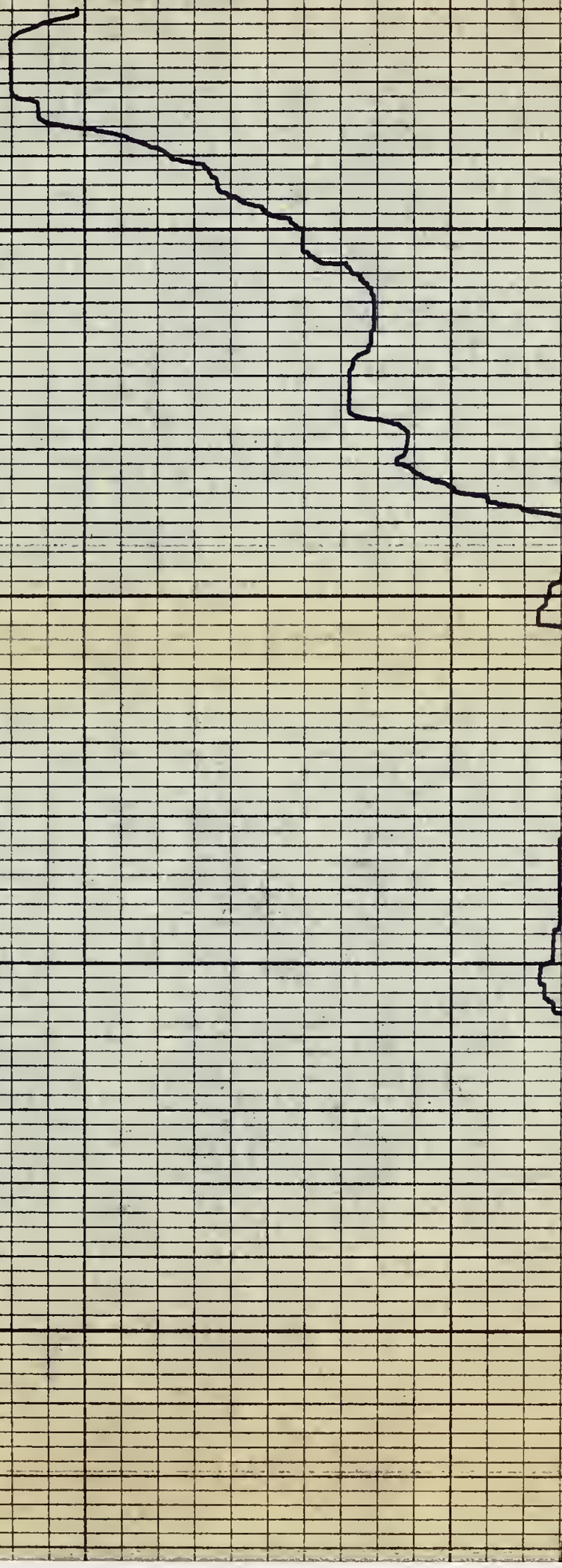

1600
1700
1800
1900
2000
T.D.
2005'
90
91
92
93
94
95
96
97
98
R.D. 2005'

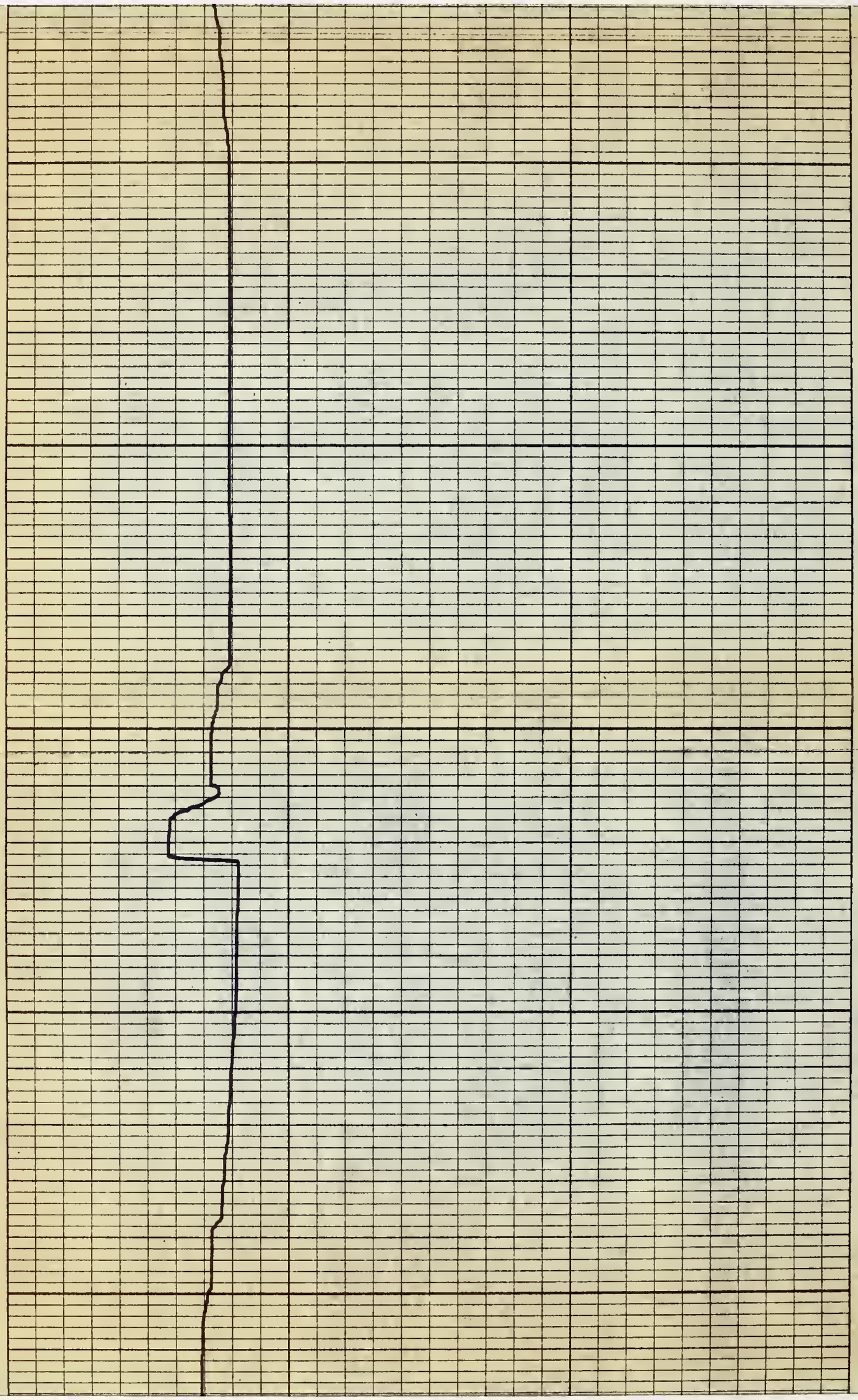
63 64 55 56 57 58 59 60

370

400

500

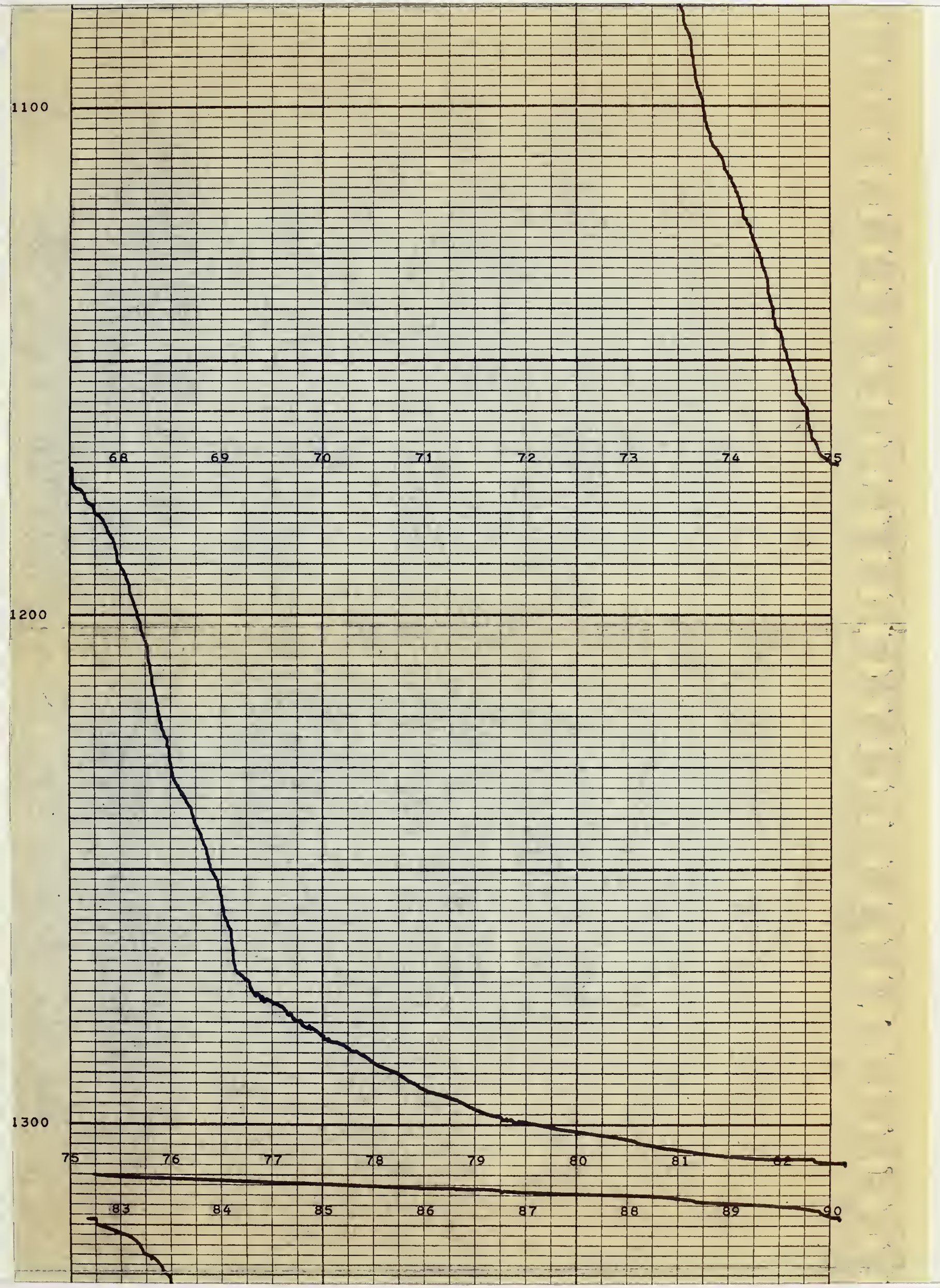


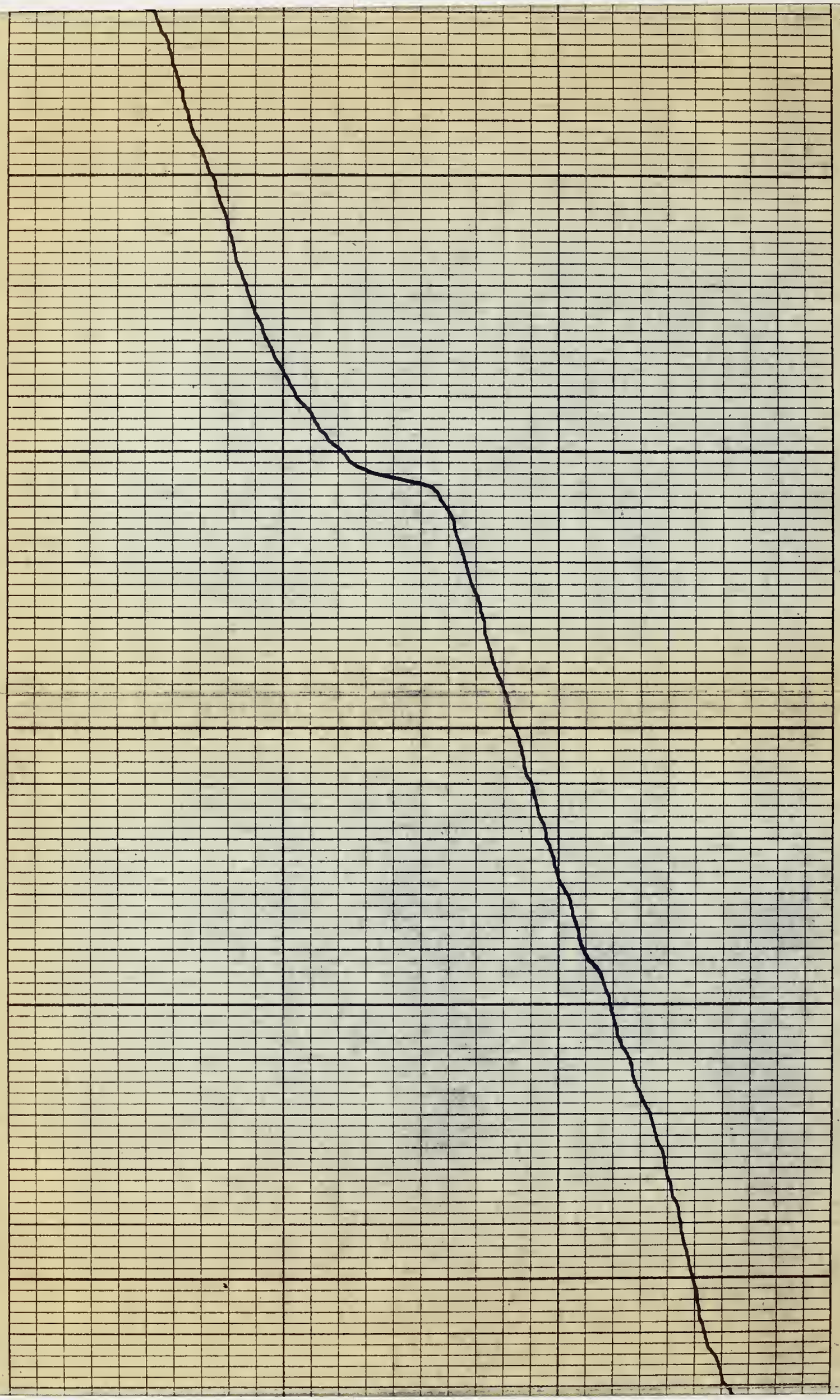

800
700
600

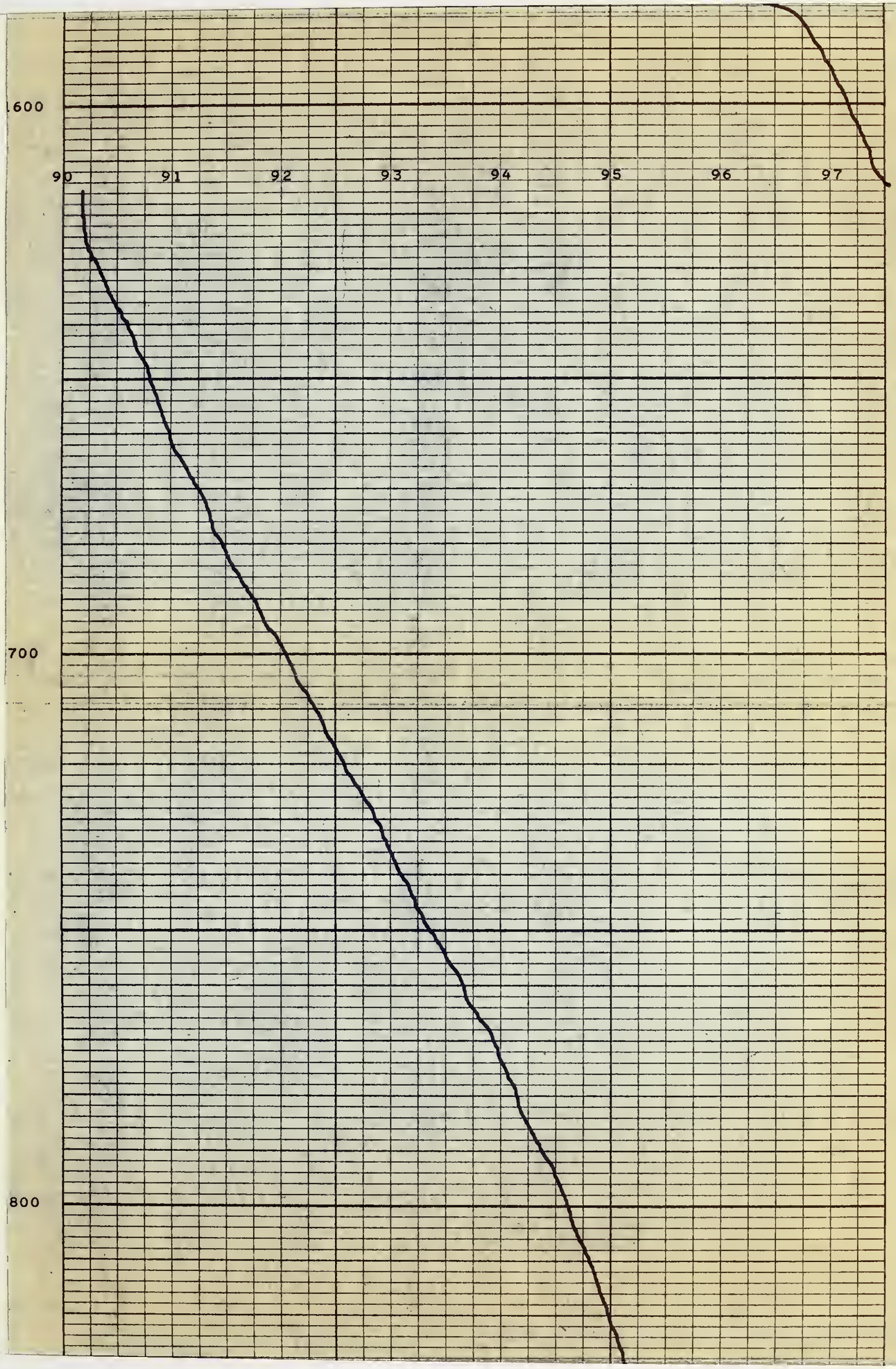
900

1000

60 61 62 63 64 65 66 67


1100
68
69
70
71
72
73
74
75
1200
1300
75
76
77
78
79
80
81
82
83
84
85
86
87
88
89
90


1500
1400


1600
90
91
92
93
94
95
96
97
700
800

900

98 99

000
.D.
005'

R.D. 2005'

EXISTING COREHOLE Cb-2

THIS ENVELOPE CONTAINS THE FOLLOWING GEOPHYSICAL LOG:

Birdwell: Temperature

II B-371

# Birdwell

## Temperature Log

FILING NO.

COMPANY ATLANTIC RICHFIELD COMPANY, ET. AL.

WELL TOSCO CB-2

FIELD

COUNTY RIO BLANCO STATE COLORADO

LOCATION: SW NE SE

SEC. 6 TWP. 3S RGE. 96W

OTHER SERVICES:

PERMANENT DATUM GROUND LEVEL ELEV. 6737'
LOG MEASURED FROM GL
DRILLING MEASURED FROM GL

ELEVATIONS:
KB.
DF.
GL. 6737'

| | | | |
|---|---|---|---|
| DATE | 4 JULY 74 | | |
| RUN NO. | 1 | | |
| TYPE LOG | TL | | |
| DEPTH—DRILLER | | | |
| DEPTH—LOGGER | 1405 | | |
| BOTTOM LOGGED INTERVAL | 1405 | | |
| TOP LOGGED INTERVAL | 290 | | |
| TYPE FLUID IN HOLE | WATER | | |
| SALINITY PPM CL. | | | |
| DENSITY LB./GAL. | | | |
| LEVEL | 282 | | |
| MAX. REC. TEMP.—DEG. F. | 70.5° | | |
| OPR. RIG TIME | 1 HR. | | |
| RECORDED BY | WILSON | | |
| WITNESSED BY | TAIT | | |
| LOCATION | LAS VEGAS | | |

| RUN NO. | BORE HOLE RECORD | | | CASING RECORD | | | |
|---|---|---|---|---|---|---|---|
| | BIT | FROM | TO | SIZE | WGT. | FROM | TO |
| 1 | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |

SSC-609-B

**WELL DATA**

| | |
|---|---|
| TYPE WELL | |
| RUN NO. | |
| PROD. OR INJ. RATE | |
| WELL HEAD PRESSURE | |
| TYPE & AMT. CEMENT | |
| LENGTH OF TIME: | |
| PROD. OR INJECTING | |
| SHUT IN | |
| SINCE CEMENTING | |
| PURPOSE OF SURVEY | |

**EQUIPMENT DATA**

| | |
|---|---|
| TYPE LOG | TL |
| RUN NO. | 1 |
| TOOL MODEL NO. | LDAH-6010 |
| DIAM. | 3-5/8" |
| SPEED FT./MIN. | 60 |
| T.C. - SEC. | 1 |
| SCALE | 1/4°/DIV. |

**GENERAL**

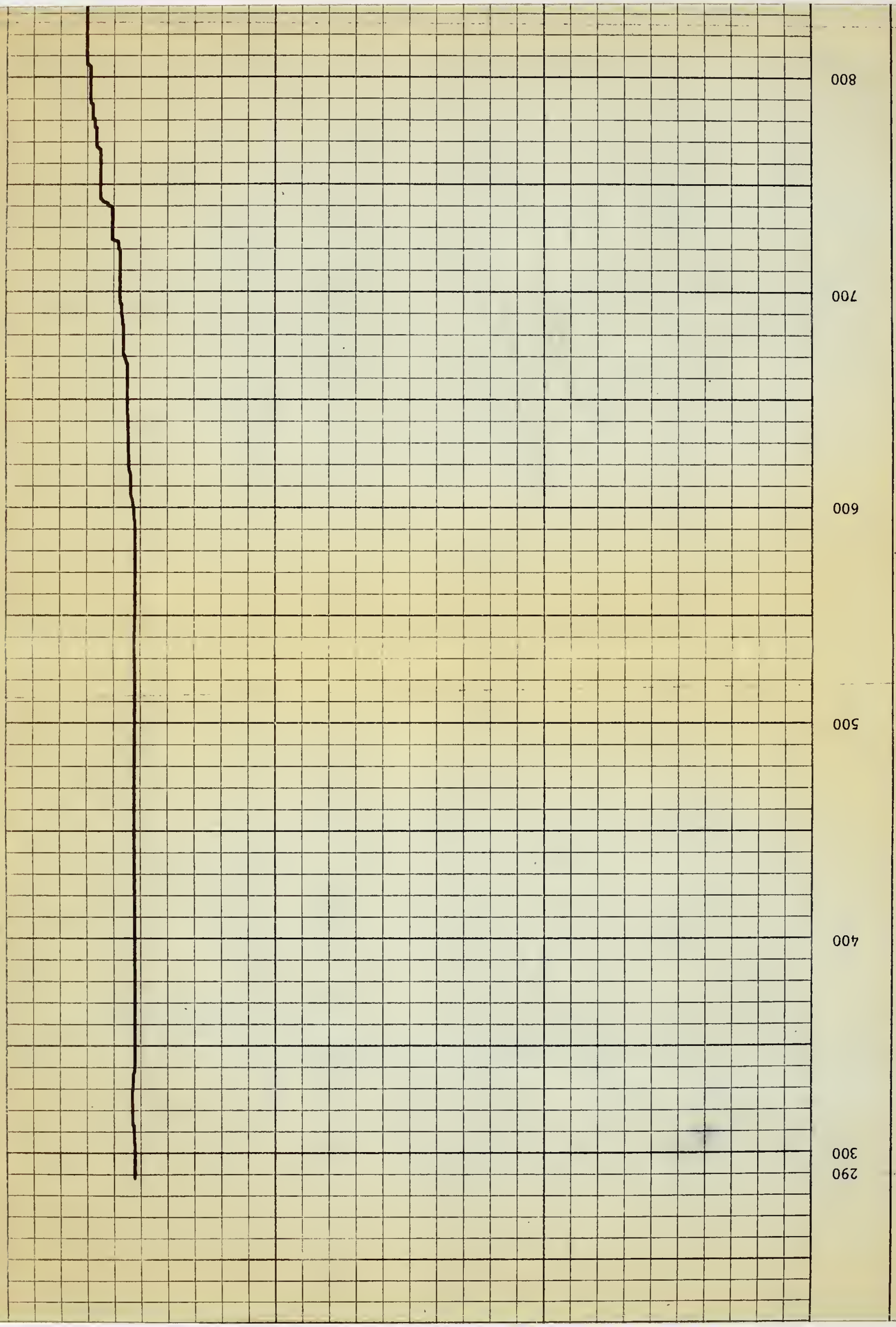
| | |
|---|---|
| HOIST TRUCK NO. | 2694 |
| INST. TRUCK NO. | 2694 |
| TOOL SERIAL NO. | |

REMARKS: N.A. Means not available

TEMPERATURE
DEGREES FAHRENHEIT

42 43 44 45

DEPTH


800
700
600
500
400
300
290

900

45 46 47 48 49 50 51 52

1000

1100

53 54 55 56 57 58 59 60

60 61 62 63 64 65 66 67

68 69 70 71 72 73 74 75

1200

1300

1400
T.D.
1405'

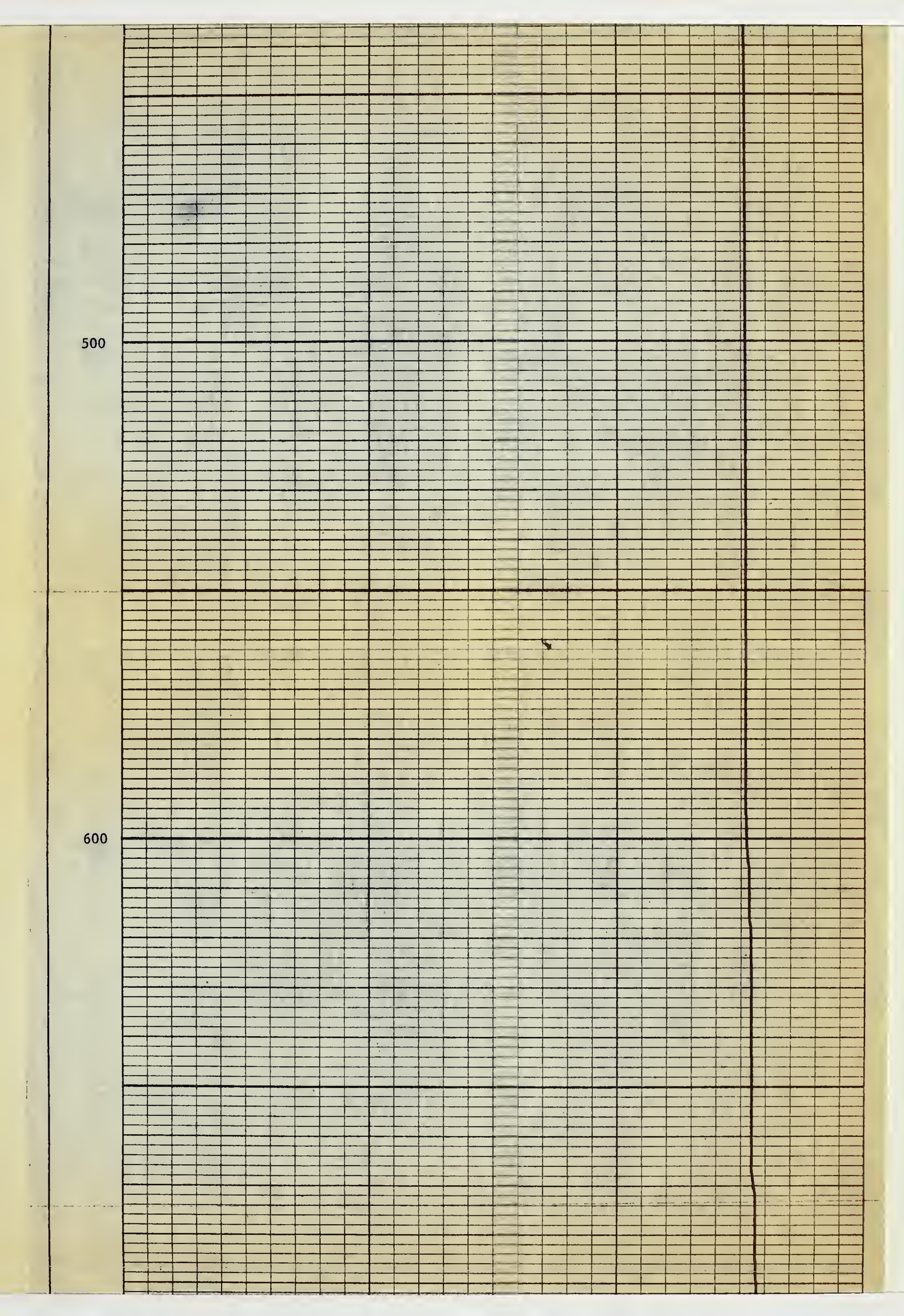
R.D. 1405'

38 39 40 41 42 43 44 45

290

300

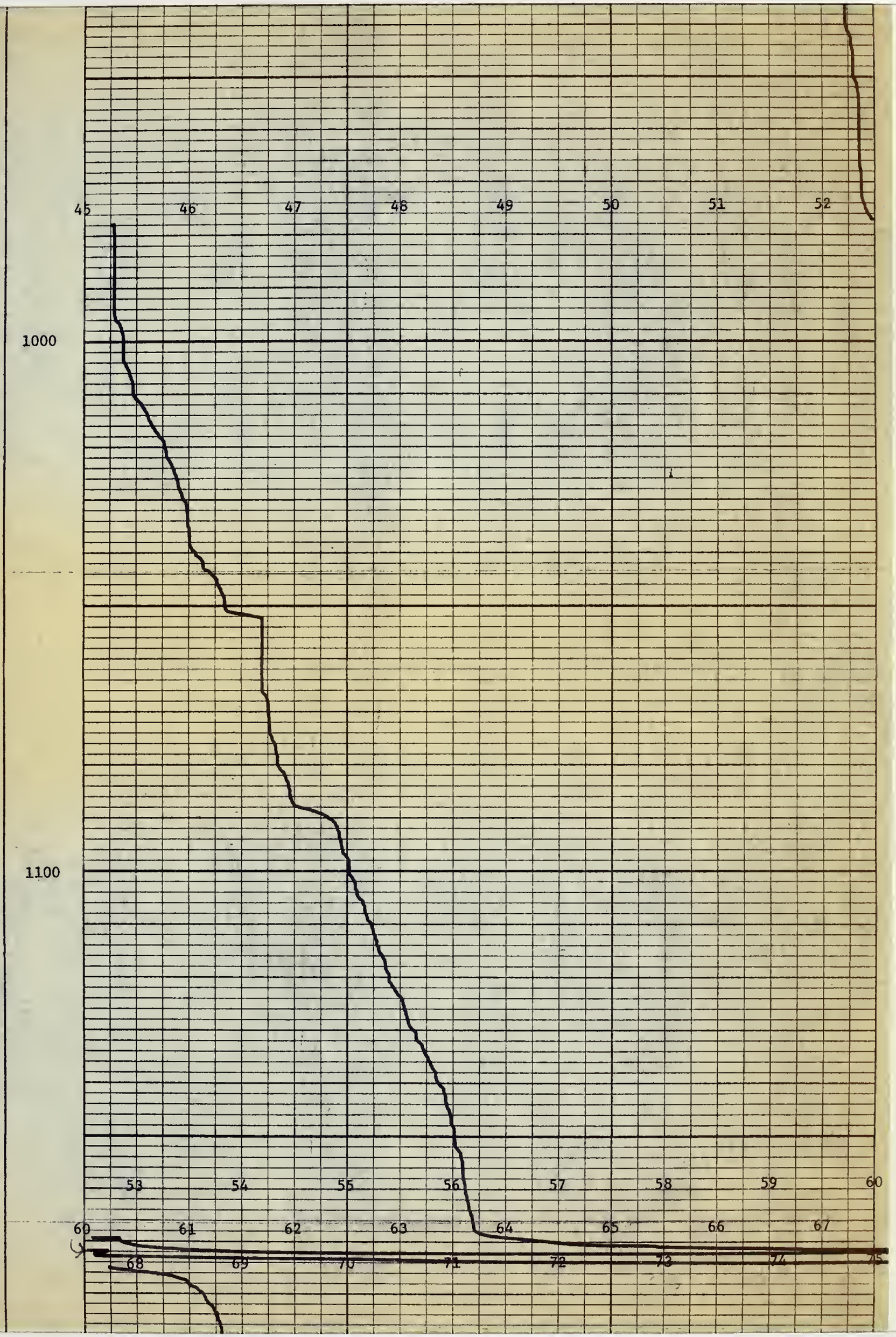
400


500
600

700

800

900


45
46
47
48
49
50
51
52
1000
1100
53
54
55
56
57
58
59
60
60
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62
63
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65
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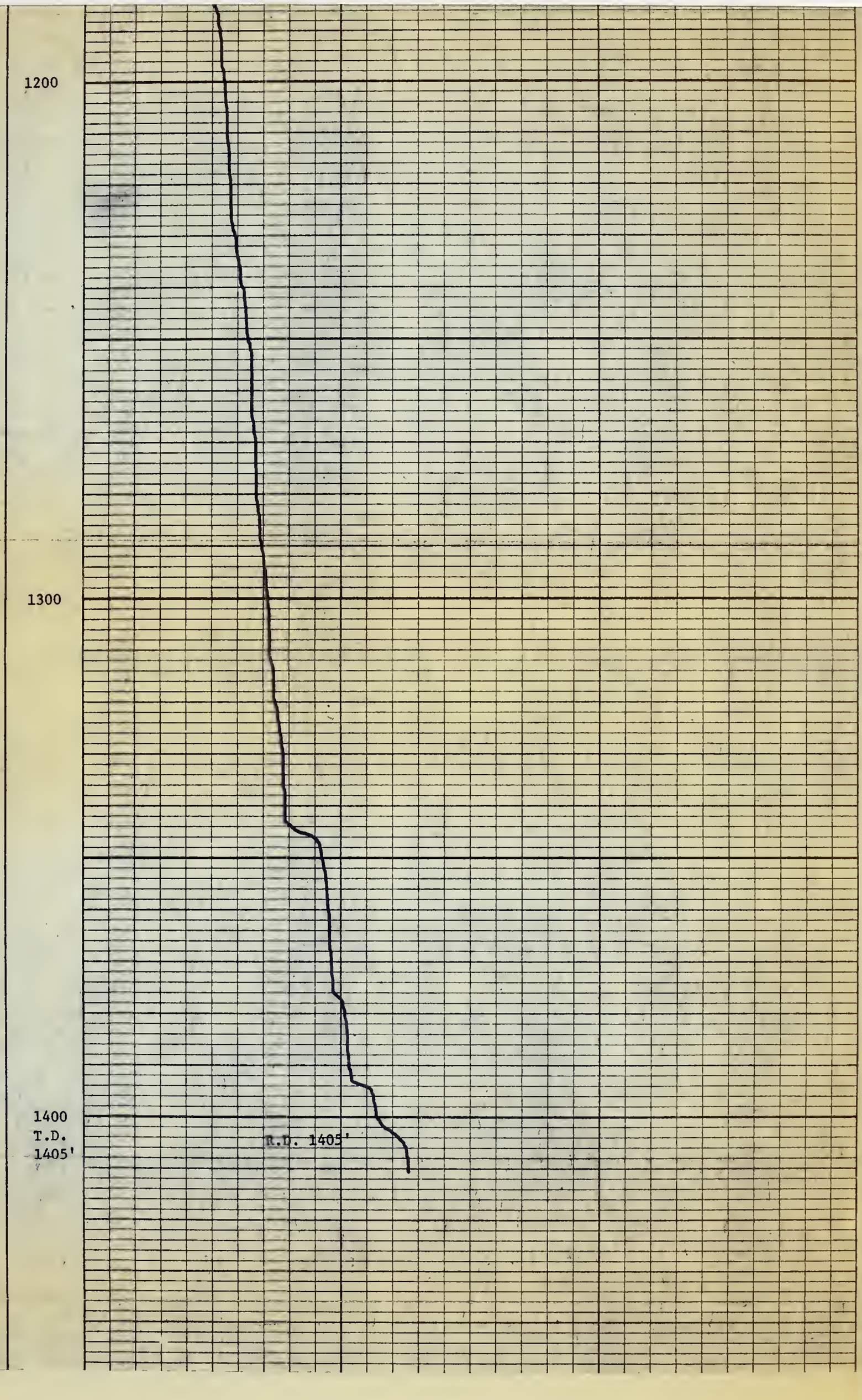
71
72
73
74
75


1200
1300
1400
T.D.
1405'
R.D. 1405'

EXISTING COREHOLE Cb-3

THIS ENVELOPE CONTAINS THE FOLLOWING GEOPHYSICAL LOG:

Birdwell: Temperature

II B-372

# Birdwell

## Temperature Log

FILING NO.

COMPANY ATLANTIC RICHFIELD COMPANY, ET. AL.

WELL CB-3

FIELD

COUNTY RIO BLANCO STATE COLORADO

LOCATION: NW SW SE

SEC. 5 TWP. 3S RGE. 96W

OTHER SERVICES:

PERMANENT DATUM GROUND LEVEL ELEV. 6743'
LOG MEASURED FROM GL
DRILLING MEASURED FROM GL

ELEVATIONS:
KB.
DF.
GL. 6743'

| | | | |
|---|---|---|---|
| DATE | 4 JULY 74 | | |
| RUN NO. | 1 | | |
| TYPE LOG | TL | | |
| DEPTH—DRILLER | 2200 +- | | |
| DEPTH—LOGGER | 375 | | |
| BOTTOM LOGGED INTERVAL | 375 | | |
| TOP LOGGED INTERVAL | 290 | | |
| TYPE FLUID IN HOLE | WATER | | |
| SALINITY PPM CL. | | | |
| DENSITY LB./GAL. | | | |
| LEVEL | 282 | | |
| MAX. REC. TEMP.—DEG. F. | 53° | | |
| OPR. RIG TIME | 1 HR. | | |
| RECORDED BY | WILSON | | |
| WITNESSED BY | TAIT | | |
| LOCATION | LAS VEGAS | | |

| RUN NO. | BORE HOLE RECORD | | | CASING RECORD | | | |
|---|---|---|---|---|---|---|---|
| | BIT | FROM | TO | SIZE | WGT. | FROM | TO |
| 1 | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |

SSC-609.B

WELL DATA

| | |
|---|---|
| TYPE WELL | |
| RUN NO. | |
| PROD. OR INJ. RATE | |
| WELL HEAD PRESSURE | |
| TYPE & AMT. CEMENT | |
| LENGTH OF TIME: | |
| PROD. OR INJECTING | |
| SHUT IN | |
| SINCE CEMENTING | |
| PURPOSE OF SURVEY | |

EQUIPMENT DATA

| | |
|---|---|
| TYPE LOG | TL |
| RUN NO. | 1 |
| TOOL MODEL NO. | LDAH-6010 |
| DIAM. | 3-5/8" |
| SPEED FT./MIN. | 60 |
| T.C. - SEC. | 1 |
| SCALE | 1/4°/DIV. |

GENERAL

| | |
|---|---|
| HOIST TRUCK NO. | 2694 |
| INST. TRUCK NO. | 2694 |
| TOOL SERIAL NO. | |

REMARKS: N.A. Means not available

TEMPERATURE
DEGREES FAHRENHEIT

DEPTH

45 46 47 48 49 50 51 52

290

300

T.D.
375'

R.D. 375'

EXISTING COREHOLE Cb-4

THIS ENVELOPE CONTAINS THE FOLLOWING GEOPHYSICAL LOG:

Birdwell: Temperature

II B-373

# Birdwell

## Temperature Log

FILING NO.

COMPANY ATLANTIC RICHFIELD COMPANY, ET. AL.

WELL TOSCO CB-4

FIELD

COUNTY RIO BLANCO STATE COLORADO

LOCATION: SE NW NW

SEC. 17 TWP. 3S RGE. 96W

OTHER SERVICES:

PERMANENT DATUM GROUND LEVEL ELEV. 7054'
LOG MEASURED FROM GL
DRILLING MEASURED FROM GL

ELEVATIONS:
KB.
DF.
GL. 7054'

| | | | |
|---|---|---|---|
| DATE | 4 JULY 74 | | |
| RUN NO. | 1 | | |
| TYPE LOG | TL | | |
| DEPTH—DRILLER | | | |
| DEPTH—LOGGER | 1437 | | |
| BOTTOM LOGGED INTERVAL | 1437 | | |
| TOP LOGGED INTERVAL | 450 | | |
| TYPE FLUID IN HOLE | WATER | | |
| SALINITY PPM CL. | | | |
| DENSITY LB./GAL. | | | |
| LEVEL | 442 | | |
| MAX. REC. TEMP.—DEG. F. | 53.5° | | |
| OPR. RIG TIME | 1 HR. | | |
| RECORDED BY | WILSON | | |
| WITNESSED BY | TAIT | | |
| LOCATION | LAS VEGAS | | |

| RUN NO. | BORE HOLE RECORD BIT | FROM | TO | CASING RECORD SIZE | WGT. | FROM | TO |
|---|---|---|---|---|---|---|---|
| 1 | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |

955-609-8

WELL DATA

| | |
|---|---|
| TYPE WELL | |
| RUN NO. | |
| PROD. OR INJ. RATE | |
| WELL HEAD PRESSURE | |
| TYPE & AMT. CEMENT | |
| LENGTH OF TIME: | |
| PROD. OR INJECTING | |
| SHUT IN | |
| SINCE CEMENTING | |

PURPOSE OF SURVEY

EQUIPMENT DATA

| | |
|---|---|
| TYPE LOG | TL |
| RUN NO. | 1 |
| TOOL MODEL NO. | LDAH-6010 |
| DIAM | 3-5/8" |
| SPEED FT./MIN. | 60 |
| T.C. - SEC. | 1 |
| SCALE | 1/4°/DIV. |

GENERAL

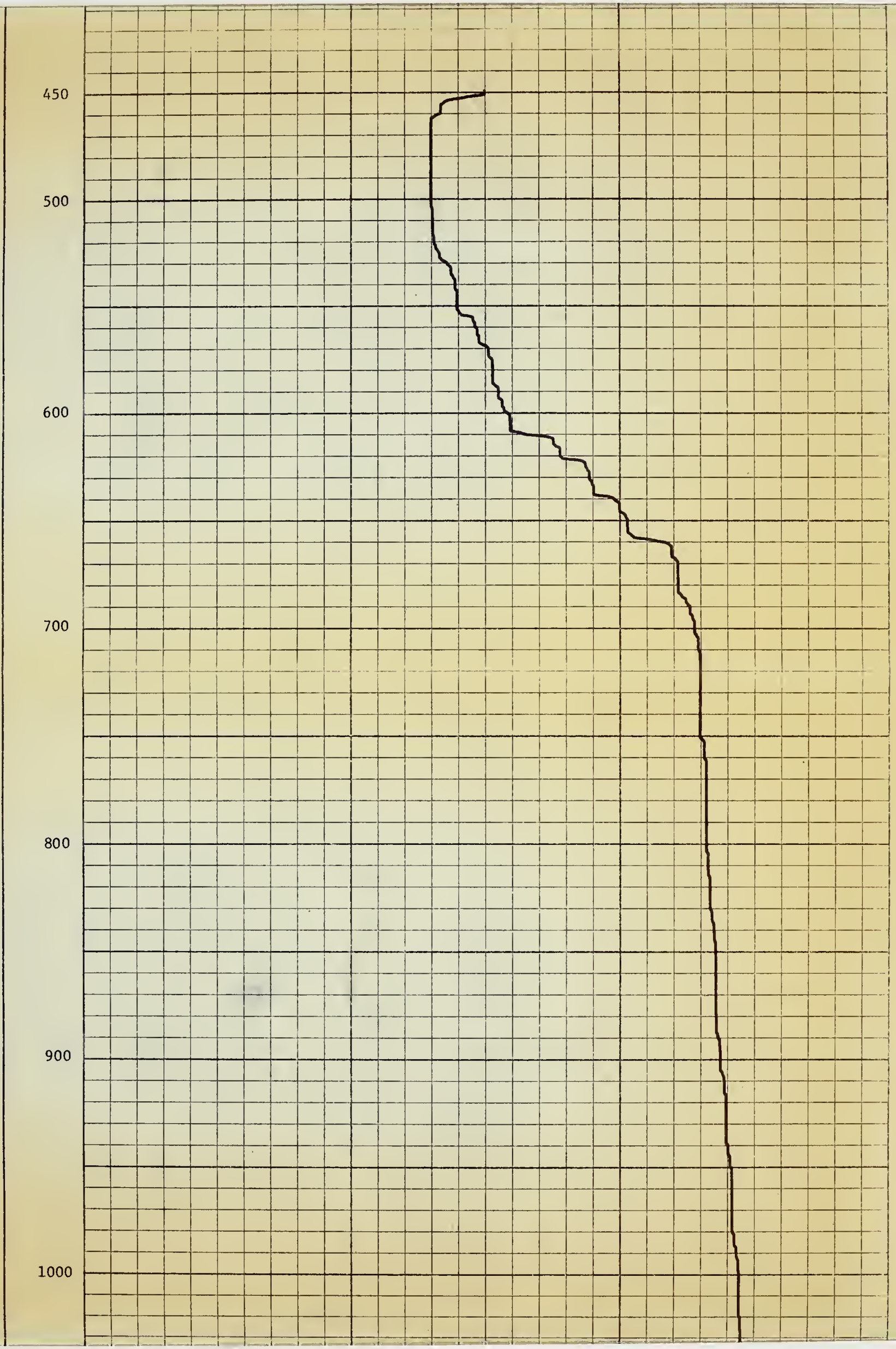
| | |
|---|---|
| HOIST TRUCK NO. | 2694 |
| INST. TRUCK NO. | 2694 |
| TOOL SERIAL NO. | |

REMARKS: N.A. Means not available

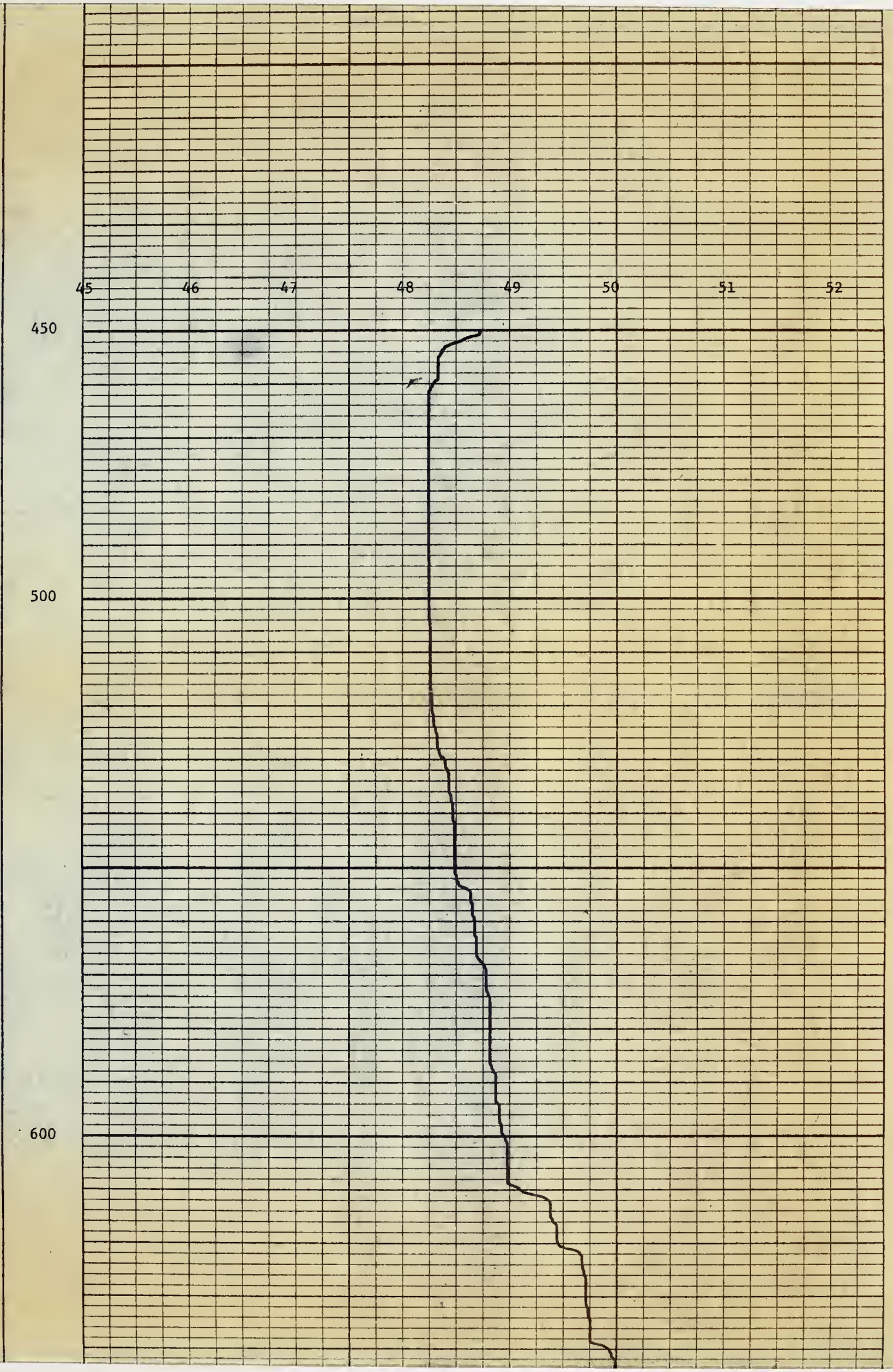
TEMPERATURE
DEGREES FAHRENHEIT

DEPTH

45 46 47 48 49 50 51 52


450
500
600
700
800
900
1000

1100
1200
1300
1400
53
54
55
56
57
58
59
60
T.D.
1437'
R.D. 1437'


45
46
47
48
49
50
51
52
450
500
600

700

800

900

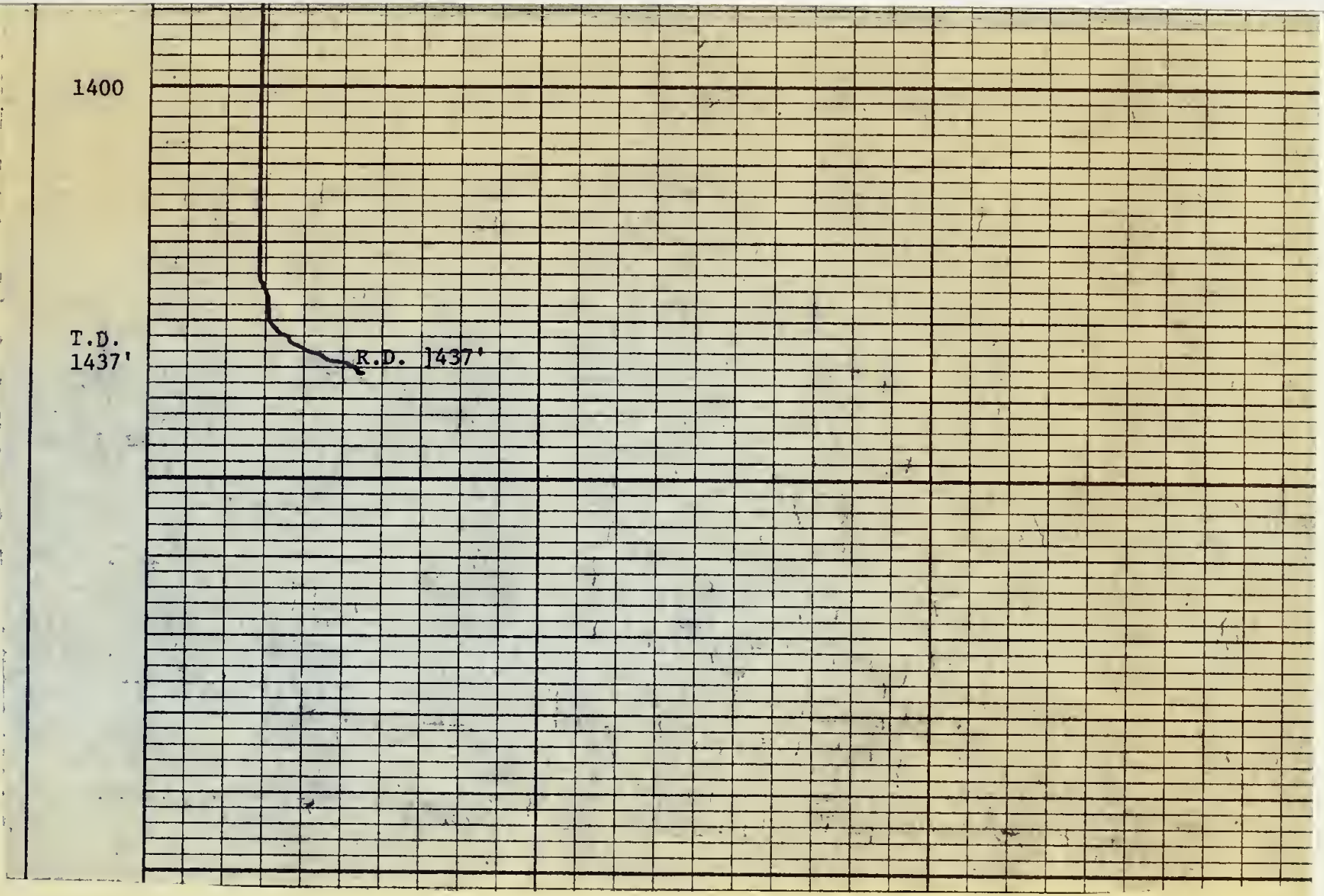
1000

1100

1200

53 54 55 56 57 58 59 6

1300


1400
T.D.
1437'
R.D. 1437'

CHAMPION CLASP NO. K-93 9½ x 12½